

**Fishery Management Report for Sport Fisheries in the
Lower Tanana River Management Area for 2001 –
2002 with available updates for 2003**

by

Mike Doxey

February 2007

Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)		General		Measures (fisheries)	
centimeter	cm	Alaska Administrative		fork length	FL
deciliter	dL	Code	AAC	mid-eye-to-fork	MEF
gram	g	all commonly accepted		mid-eye-to-tail-fork	METF
hectare	ha	abbreviations	e.g., Mr., Mrs., AM, PM, etc.	standard length	SL
kilogram	kg			total length	TL
kilometer	km	all commonly accepted			
liter	L	professional titles	e.g., Dr., Ph.D., R.N., etc.	Mathematics, statistics	
meter	m			<i>all standard mathematical</i>	
milliliter	mL	at	@	<i>signs, symbols and</i>	
millimeter	mm	compass directions:		<i>abbreviations</i>	
		east	E	alternate hypothesis	H _A
		north	N	base of natural logarithm	<i>e</i>
		south	S	catch per unit effort	CPUE
		west	W	coefficient of variation	CV
		copyright	©	common test statistics	(F, t, χ^2 , etc.)
		corporate suffixes:		confidence interval	CI
		Company	Co.	correlation coefficient	
		Corporation	Corp.	(multiple)	R
		Incorporated	Inc.	correlation coefficient	
		Limited	Ltd.	(simple)	r
		District of Columbia	D.C.	covariance	cov
		et alii (and others)	et al.	degree (angular)	°
		et cetera (and so forth)	etc.	degrees of freedom	df
		exempli gratia		expected value	<i>E</i>
		(for example)	e.g.	greater than	>
		Federal Information		greater than or equal to	≥
		Code	FIC	harvest per unit effort	HPUE
		id est (that is)	i.e.	less than	<
		latitude or longitude	lat. or long.	less than or equal to	≤
		monetary symbols		logarithm (natural)	ln
		(U.S.)	\$, ¢	logarithm (base 10)	log
		months (tables and		logarithm (specify base)	log ₂ , etc.
		figures): first three		minute (angular)	'
		letters	Jan,...,Dec	not significant	NS
		registered trademark	®	null hypothesis	H ₀
		trademark	™	percent	%
		United States		probability	P
		(adjective)	U.S.	probability of a type I error	
		United States of		(rejection of the null	
		America (noun)	USA	hypothesis when true)	α
		U.S.C.	United States	probability of a type II error	
			Code	(acceptance of the null	
		U.S. state	use two-letter	hypothesis when false)	β
			abbreviations	second (angular)	"
			(e.g., AK, WA)	standard deviation	SD
				standard error	SE
				variance	
				population	Var
				sample	var
Weights and measures (English)					
cubic feet per second	ft ³ /s				
foot	ft				
gallon	gal				
inch	in				
mile	mi				
nautical mile	nmi				
ounce	oz				
pound	lb				
quart	qt				
yard	yd				
Time and temperature					
day	d				
degrees Celsius	°C				
degrees Fahrenheit	°F				
degrees kelvin	K				
hour	h				
minute	min				
second	s				
Physics and chemistry					
all atomic symbols					
alternating current	AC				
ampere	A				
calorie	cal				
direct current	DC				
hertz	Hz				
horsepower	hp				
hydrogen ion activity	pH				
(negative log of)					
parts per million	ppm				
parts per thousand	ppt,				
	‰				
volts	V				
watts	W				

FISHERY MANAGEMENT REPORT NO. 07-02

**FISHERY MANAGEMENT REPORT FOR SPORT FISHERIES IN THE
LOWER TANANA RIVER MANAGEMENT AREA FOR 2001 – 2002 WITH
AVAILABLE UPDATES FOR 2003**

by

Mike Doxey,
Division of Sport Fish

Alaska Department of Fish and Game
Division of Sport Fish, Research and Technical Services
333 Raspberry Road, Anchorage, Alaska, 99518-1599

February 2007

The Division of Sport Fish Fishery Management Reports series was established in 1989 for the publication of an overview of Division of Sport Fish management activities and goals in a specific geographic area. Since 2004, the Division of Commercial Fisheries has also used the Fishery Management Report series. Fishery Management Reports are intended for fishery and other technical professionals, as well as lay persons. Fishery Management Reports are available through the Alaska State Library and on the Internet: <http://www.sf.adfg.state.ak.us/statewide/divreports/html/intersearch.cfm>. This publication has undergone regional peer review.

*Mike Doxey,
Alaska Department of Fish and Game, Division of Sport Fish,
1300 College Road, Fairbanks, AK 99701, USA*

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ADF&G, Sport Fish Division, Research and Technical Services, 333 Raspberry Road, Anchorage AK 99518 (907)267-2375.

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ABSTRACT

Historic, current and future performance and management of the sport fisheries of the ADF&G Region III Lower Tanana River Management Area (LTMA) is presented in this report. Particular emphasis is placed on the LTMA fisheries' performances and management from 2001-02, with available updates for 2003.

The Tanana River drainage is the second largest tributary system of the Yukon River. The mainstem Tanana River is a large glacial system formed by the confluence of the Chisana and Nabesna rivers near Tok and the Alaska - Canada border which flows in a generally northwest direction for some 570 river miles to the Yukon River. The LTMA consists of all waters of the Tanana River drainage downstream from the Banner Creek drainage flowing into the Tanana from the north and the nearby Little Delta River drainage on the south.

Much of the human population in Region III is located within the Tanana River drainage along the Alaska, Richardson and Parks highways, and along the road system around Fairbanks. These highways and their secondary roads provide much of the access to the LTMA sport fisheries.

The majority of fishing effort in the LTMA occurs on the Chena, Salcha, Chatanika and Nenana rivers; Minto Flats; Harding Lake and various stocked waters. Sport anglers target many species in the LTMA, however the most commonly targeted species are: Chinook salmon *Oncorhynchus tshawytscha*, coho salmon *O. kisutch*, Arctic grayling *Thymallus arcticus*, burbot *Lota lota*, northern pike *Esox lucius*, and lake trout *Salvelinus namaycush*.

As a means to assist Board members in acquiring information in a timely manner, Appendix C has been constructed (page 87). This table guides the reader to specific information contained within text, table and graphic format that may be useful in evaluating regulatory proposals.

Key Words: Arctic grayling, burbot, Chatanika River, Chena River, chum, Chinook, coho, Harding Lake, lake trout, LTMA, management, Minto Flats, Nenana River, northern pike, rainbow trout, Salcha River, salmon, sport fish, stocked waters, Tanana River, UTMA, whitefish, Yukon River

PREFACE

The Alaska Department of Fish and Game (ADF&G) is the fish and wildlife management agency for the State of Alaska. The department consists of six divisions (three management divisions and three with other purposes). Sport Fish Division is one of the management divisions. The goals of Sport Fish Division are to conserve wild stocks of sport fish, to provide a diversity of recreational fishing opportunities, and to optimize social and economic benefits from recreational fisheries. In order to implement these goals, the Division has instituted a fisheries management process.

This report is one of a series of Area Management Reports (AMRs) providing updates of fisheries management information for important sport fisheries within Sport Fish Division's Region III. Information is presented in this report for the Lower Tanana River Drainage Management Area (LTMA). The report is written to make information available to the State Board of Fisheries, Fish and Game Advisory Committees, the general public, and other interested parties. It presents fisheries assessment information and the management strategies that are developed from that information. Also included are descriptions of the fisheries regulatory process, the geographic area covered, and administrative, regulatory, and assessment project boundaries germane to the LTMA. This report also describes funding sources for Sport Fish Division programs, and provides information about Fish Stocking programs and other Sport Fish Division management programs within the Lower Tanana River Drainage Management Area.

Fisheries stock assessment research projects are developed, scheduled, and implemented to meet information needs identified by fisheries managers. Biological information gathered during the

course of these research projects is combined with effort information and input from user groups and is used to assess the need for and to develop fisheries management plans and propose regulatory strategies.

There is an annual Regional Area Review meeting in mid-winter during which the current status of important area fisheries is presented and research needs are identified. The area review is followed in a few weeks by a series of operational planning meetings to begin the final development and planning of the fisheries research projects that will be undertaken during the next year. Both ongoing and new research projects are considered during operational planning.

Sport Fish Division management and research activities are primarily funded by a combination of State of Alaska Fish and Game (F&G) and Federal Aid in Fisheries Restoration (D-J) monies. The F&G funds come from the sale of fishing licenses. The D-J (Dingle-Johnson, named after the congressmen who wrote the act) funds are from a Federal tax on fishing tackle and equipment. D-J funds are provided to the states at a match of up to three-to-one with the F&G funds. There is also an amendment to the D-J Act (W-B, for Wallop-Breaux) that provides money to states for boating access projects at the same three-to-one match with F&G funds. Funding Source for W-B money is a tax on boat gas and equipment. Other funding sources can include contracts with various government agencies and the private sector.

INTRODUCTION AND BACKGROUND

REGION III DESCRIPTION

The Alaska Board of Fisheries (BOF) has divided the State of Alaska into 10 regulatory areas for the purpose of organizing the sport fishing regulatory regime by drainages and fisheries. These areas (not to be confused with Regional management areas) are described in Title 5 of the Alaska Administrative Code (5 AAC). Sport Fish Division of the Alaska Department of Fish and Game (ADF&G) divides the state into three administrative regions with boundaries roughly corresponding to groups of the BOF regulatory areas (Figure 1). Region I is Southeast Alaska, Region II covers portions of Southcentral Alaska, Kodiak, Southwestern Alaska, and the Aleutian Islands. Region III includes two and most of a third of the BOF fishery regulatory areas. They are the Upper Copper and Upper Susitna regulatory area, the Arctic-Yukon-Kuskokwim regulatory area, and the Tanana River drainage.

Region III is the largest region, encompassing the majority of the landmass of the State of Alaska (Figure 1). The region encompasses about 526,000 mi² (1,357,080 km²) of Alaska, some of the state's largest river systems (the Yukon, the Kuskokwim, the Colville, Noatak, and upper Copper River and upper Susitna River drainages), thousands of lakes, and thousands of miles of coastline and streams. Regional coastline boundaries extend from Sheldon Point in the southwest, around all of western, northwestern and northern Alaska to the Canadian border on the Arctic Ocean. Region III as a whole is sparsely populated. The most densely populated center is located in the Tanana River valley with Fairbanks (population about 31,000) as the largest community. The Regional Headquarters office is located in the Creamer's Field Wildlife Refuge in Fairbanks.

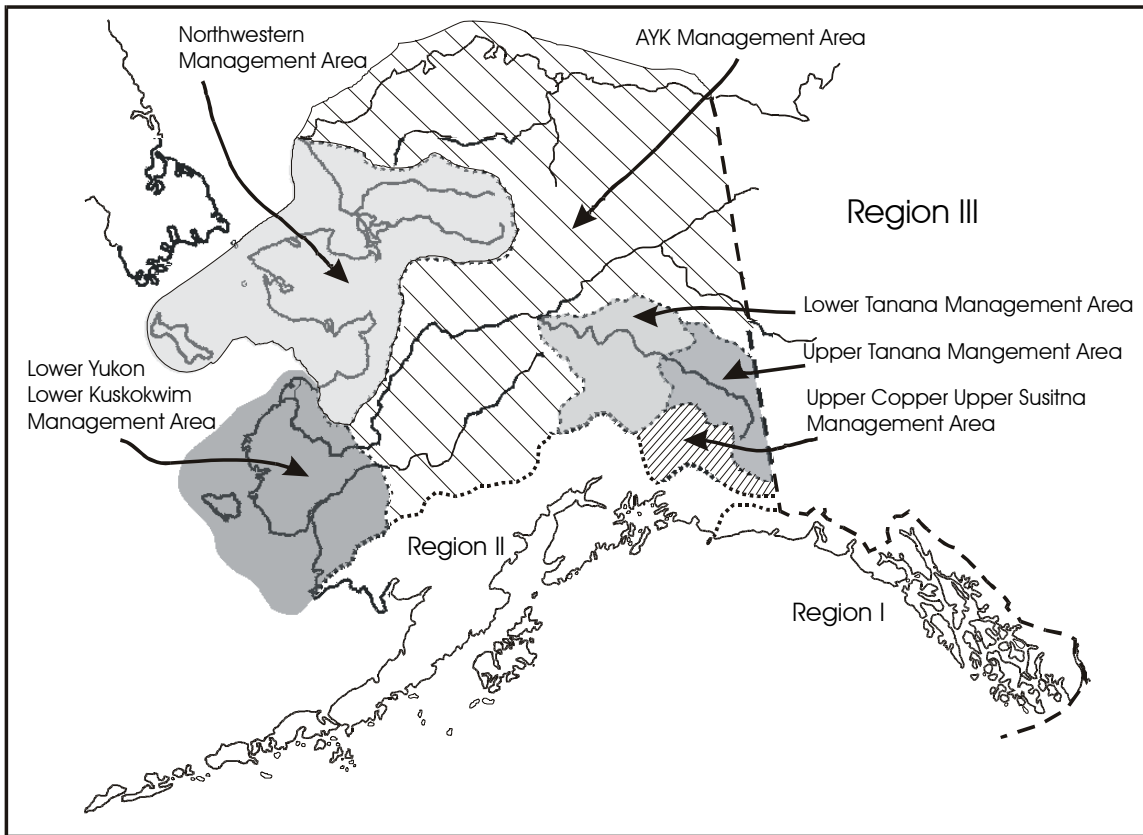


Figure 1.-Map of the sport fish regions in Alaska and the six Region III management areas.

For administrative purposes Sport Fish Division has divided Region III into six fisheries management areas (Figure 1). They are:

- 1) The Northwestern Management Area (Norton Sound, Seward Peninsula and Kotzebue Sound drainages).
- 2) The Arctic - Yukon - Kuskokwim (AYK) Management Area (the North Slope drainages, the Yukon River drainage above Paimute except the Tanana River drainage, and the Kuskokwim River drainage upstream from the Aniak River).
- 3) The Lower Yukon/Lower Kuskokwim (LYLK) Management Area (the Yukon drainage below Paimute and the Kuskokwim drainage downstream from and including the Aniak River drainage), which was created and added to Region III in 1999.
- 4) The Upper Copper/Upper Susitna (UCUS) Management Area (the Copper River drainage and the Susitna River drainage above the Oshetna River), which was added to Region III in 1997.
- 5) The Upper Tanana River (UTMA) Management Area (The Tanana River drainage upstream from Banner Creek and the Little Delta River).
- 6) The Lower Tanana River (LTMA) Management Area (The Tanana River drainage downstream from Banner Creek and the Little Delta River; Figure 2).
- 7) Area offices for the six areas are located in Nome/Fairbanks, Fairbanks, Bethel, Glennallen, Delta Junction, and Fairbanks, respectively.

THE ALASKA BOARD OF FISHERIES

The Alaska Board of Fisheries (BOF) is the seven-member board that sets fishery regulations and harvest levels, allocates fishery resources, and approves or mandates many fishery conservation plans for the State of Alaska. Sport, subsistence, personal use, and commercial fisheries are regulated on state waters by the BOF. Board members are appointed to 3-year terms by the Governor and must be confirmed by the legislature. There is a parallel Board of Game that deals with wildlife management issues, hunting, and trapping.

Statewide fisheries issues may be considered at any BOF meeting. Under the current operating schedule, the BOF considers fishery issues for regulatory areas or groups of regulatory areas on a 3-year cycle. The BOF meetings are usually in the wintertime, between early October and late March. Regulation proposals and management plans are received for evaluation by the BOF from ADF&G, local advisory committees, special interest organizations, and the general public (any Alaskan can submit a proposal to the BOF). During its deliberations the BOF receives input and testimony through oral and written reports from staff of the ADF&G, members of the general public, representatives of local fish and game Advisory Committees, and special interest groups such as fishermen's associations and clubs.

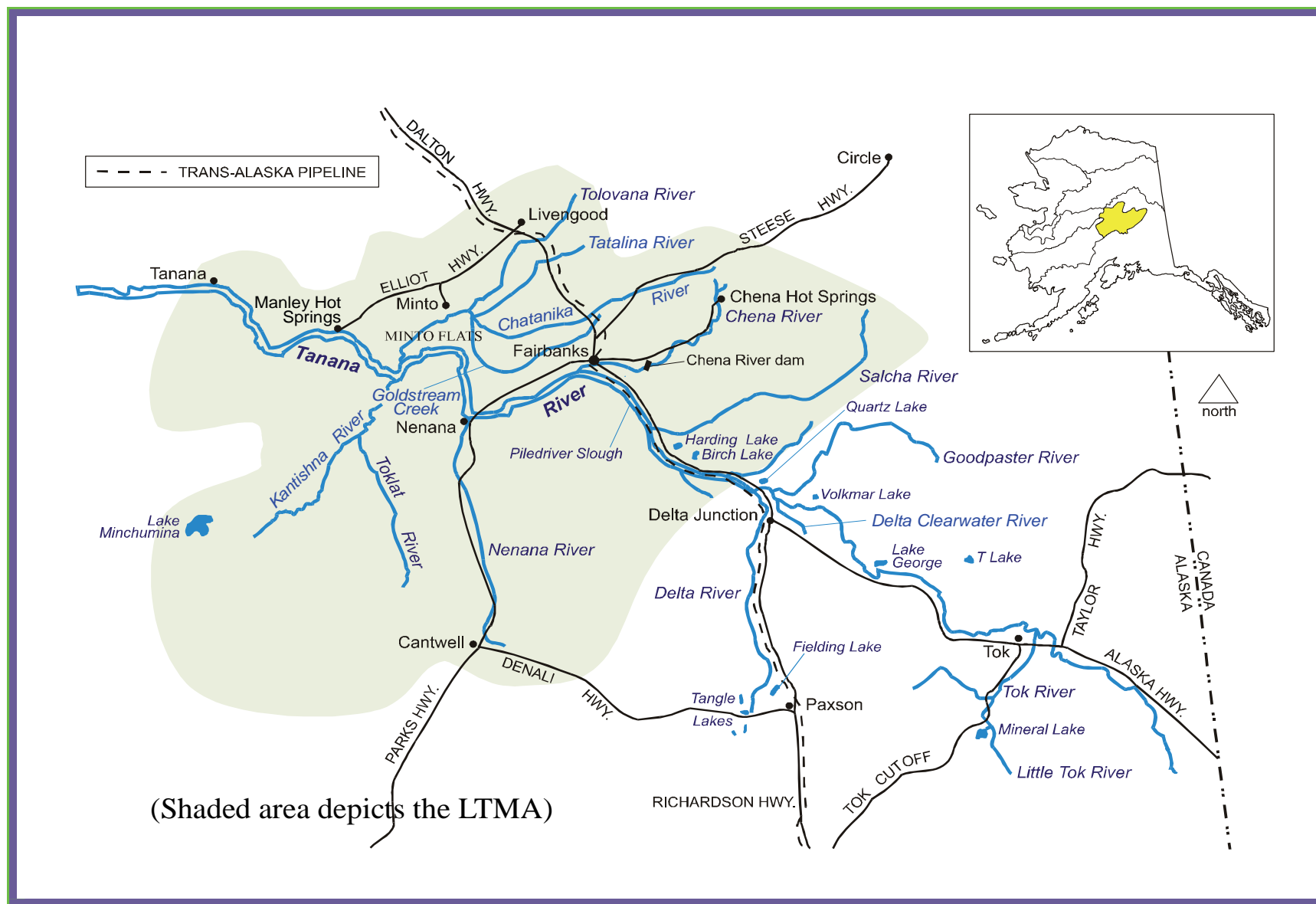


Figure 2.-Map of the Lower Tanana River Management Area (LTMA).

ADVISORY COMMITTEES

Local Fish and Game Advisory committees have been established throughout the state to assist the Boards of Fish and Game in assessing fisheries and wildlife issues and proposed regulation changes. Advisory committee members are individuals from the local public who are nominated and voted on by all present during an advisory committee meeting. They serve for 3 years. Most active committees meet in the fall and winter on a monthly basis, usually prior to Board meetings. Advisory meetings allow opportunity for direct public interaction with department staff answer questions and providing clarification concerning proposed regulatory changes. The Boards Support Section within the Division of Administration provides administrative and logistical support for the BOF and Fish and Game Advisory Committees. As of 2003, the department had direct support responsibilities for 81 Advisory committees in the state. Jim Marcotte serves as the Interior Region Coordinator, stationed in Fairbanks.

ADF&G EMERGENCY ORDER AUTHORITY

The ADF&G has emergency order (EO) authority (5 AAC 75.003) to modify time, area, and bag/possession limit regulations. EOs are implemented to deal with conservation issues that arise that are not adequately controlled by existing regulations. In that scenario, EOs deal with the situation until it is resolved or the BOF can formally take up the issue. EOs are also the mechanism by which "in-season" management of fisheries is accomplished. In-season management is usually in accordance with a fisheries management plan approved by the BOF.

FEDERAL REGIONAL ADVISORY COUNCILS

Under ANILCA (the Alaska National Interest Lands Conservation Act) the federal government requires the State of Alaska to establish use of fish and game by rural residents as the top priority of possible uses, and establishes Federal rules to which the state priority must conform. This is unconstitutional under state law, which requires equal access to those resources for all citizens. Because the state failed to amend the constitution of the State of Alaska to implement the federal law, managers of federal lands in Alaska are obligated by ANILCA to implement that priority on federal lands.

A federal system has been created that establishes 10 federally funded Regional Advisory Councils (RACs) providing recommendations to ensure that the rural priority for fish and game use is implemented on federal lands statewide. The RACs make recommendations to a Federal Subsistence Board, which then codifies them into federal law. As of 2003, implementation of this system to regulate Alaska's fisheries on federal land was proceeding, and RACs were meeting to consider fisheries proposals.

REGION III SPORT FISH DIVISION RESEARCH AND MANAGEMENT STAFFING

The Region III Sport Fish Division staff biologists are organized into a research staff and a management staff. The management staff consists of a management supervisor, an area management biologist (AMB) for each of the six management areas, one or more assistant area management biologists (for all areas combined, not six assistant AMBs), and two stocked waters biologists. The area biologists evaluate fisheries and propose and implement management strategies through plans and regulations in order to meet divisional goals, and may have one or more assistants. Interaction with the BOF, Advisory Committees, and the general public is an important part of their job. The stocked waters biologists plan and implement the regional stocking program for recreational fisheries, and have one or more field assistants.

The research staff consists of a research supervisor, eight research biologists (in 2003), and various field assistants. The research biologists plan and implement fisheries research projects in order to provide information needed by the management group to meet divisional goals. The duties of the management and research biologists overlap, and stocked waters biologists engage in both management and research. There are also two biometricians providing statistical planning and data analysis. Biometricians, including those stationed in Fairbanks, are assigned projects on a statewide basis by their supervisors in Anchorage.

In addition to overall supervisory and administrative staff, several regional personnel are assigned to the Region III Headquarters Office in Fairbanks and support the research and management staff.

A planner is on staff to coordinate planning and public involvement in fisheries management and other planning.

A Regional Management Biologist administers the Regional Fishing and Boating Access Program, assists to the management supervisor, and conducts fisheries research projects. The Regional Management Biologist has an assistant who manages the construction and mapping components of the Access Program.

An information officer was added to the Region III Sport Fish Division staff in 2000, and charged with the responsibility of organizing and upgrading the sport fishery outreach and information programs. She has an assistant, and one or more seasonal employees to help provide information to both visitors to the office and to the general public through outreach programs.

THE STATEWIDE HARVEST SURVEY

Recreational angling effort and catch and harvest of important sport fish species in Alaska has been estimated and reported annually by Sport Fish Division's Research and Technical Services Section (RTS) since 1977 (Mills 1979-1994; Howe et al. 1995-1996, 2001a-d, Walker et al. 2003; Jennings et al. 2004, 2006). The Statewide Harvest Survey (SWHS), a questionnaire mailed out to a random selection of sport fish license purchasers, is the instrument that provides the data which is analyzed to make these estimates. Estimates for a particular year usually become available in August and September of the following year, and the report is published sometime after that. Effort, catch, and harvest are estimated on a site-specific basis, but estimates of effort directed toward a single species and the resulting species-specific catch per unit effort (CPUE) information can seldom be derived from the report because effort is combined across all fisheries reported in the SWHS for a particular water. Effort tables are provided in this report where the estimated effort may be species-specific. Effort is estimated as number of anglers, number of trips, and most importantly, days fished. A "day fished" represents a visit to the water during which the angler fished, and not 24 hours of effort. Utility of the estimates is strongly dependant on the number of responses for a site (Mills and Howe 1992). Estimates based on 12 or fewer responses are useful only to document that fishing occurred. Twelve to 29 responses produce estimates useful for indicating relative order of magnitude and for assessing long-term trends, and estimates based on 30 or more responses are generally an accurate meter of harvested catch numbers.

ORGANIZATION OF THIS REPORT

This report for 2001-2002 is organized into 17 sections. Section I provides an overview of the Lower Tanana River Management Area. Included is a description of the management area, BOF and other regulatory actions, management and research plans and activities within the area, issues, and access projects. Section II provides overall effort and harvest estimate data and economic information (if available) for the Management Area. Sections III - XVII are the fisheries descriptions. Within the appendices are LTMA sport fishing regulations and staff comments on regulatory proposals germane to the LTMA that will be addressed by the BOF at the January, 2004 meeting, and the guide to areas of this report that may help evaluate proposals.

In several cases, there are separate sections describing fisheries upon different species occurring within the same waterbody (Chena River Chinook and Chena River grayling, for instance). The general description of the waterbody will be found in the Background and Historical Perspective section of the first section dealing with a fishery within that waterbody. Thereafter, additional description of the waterbody will appear in subsequent sections only if pertinent to that particular section. Many of the background descriptions will be derived from the introductions of Fisheries Data Series reports. Some will be fairly complete; others will be improved in subsequent annual updates of this report.

All effort, catch, and harvest information in this report is derived from the SWHS estimates cited above unless otherwise specified. Generally the estimates for the most recent year will not have been published as this report is written, but final estimates will be available from RTS in draft form and will appear in this report.

Because this report is written for a diverse readership, most units of measure are given using the English system (miles, acres, river miles, etc.). Fish lengths may be provided in either inches (TL-total length from snout to tip of tail, as in regulations) or millimeters (FL-fork length from snout to fork of tail, as in research results).

SECTION I: LOWER TANANA RIVER DRAINAGE MANAGEMENT AREA OVERVIEW

MANAGEMENT AREA DESCRIPTION

Lower Tanana River Drainage Management Area

After the Koyukuk drainage, the Tanana River drainage is the second largest tributary system of the Yukon River. The Tanana River basin (Figure 2) drains an area of approximately 45,155 mi² (116,500 km²). The mainstem Tanana River is a large glacial stream formed by the confluence of the Chisana and Nabesna rivers near Tok and the Alaska - Canada border which flows in a generally northwest direction for some 570 river miles (917-km) to the Yukon. The confluence of the Tanana and Yukon rivers, near the village of Tanana, is 695 river miles from the mouth of the Yukon on the Bering Sea coast. Much of the human population in Region III is located within the Tanana River drainage along the Alaska, Richardson and Parks highways, and along the road system around Fairbanks. These highways and their secondary roads provide much of the access to sport fisheries.

The Tanana River drainage is divided by Sport Fish Division into two management areas - the Upper Tanana River drainage Management Area (UTMA, commonly called the "Delta Management Area"), and the Lower Tanana River Drainage Management Area (LTMA,

commonly called the "Fairbanks Management Area"). The LTMA consists of all waters of the Tanana River drainage downstream from the Banner Creek drainage flowing into the Tanana from the north and the nearby Little Delta River drainage on the south. Communities and municipalities located within the LTMA include Nenana, Anderson, Healy, Cantwell, Manley, Livengood, Minto, Fairbanks/Ft. Wainwright, North Pole, Eielson AFB, Salcha, Two Rivers, Chatanika, Fox, and Ester. The Fairbanks North Star Borough lies entirely within the LTMA, as does part of the Denali Borough.

Prior to 1998 this Annual Management Report (AMR) was a combined report for the entire Tanana River drainage, co-authored by the area biologists for the UTMA and the LTMA. After 1998, separate reports are being written for each area.

Mike Kramer was the Area Management Biologist for the LTMA from the early 1970s to 1990. Jerry Hallberg was the Area Management Biologist from 1990 to 1998. Jerry retired from the department in the fall of 1998 and Tim Viavant served as acting Area Manager until Mike Doxey was selected as the Area Management Biologist in December, 1998.

THE STATEWIDE HARVEST SURVEY APPLIED TO THE TANANA RIVER DRAINAGE

The Tanana River drainage in its entirety is included in Statistical Area U of the Statewide Harvest Survey. While most sites for which effort, catch, and harvest are estimated are clearly within one of the two management areas, a few such as the "Middle Tanana River", "Other Lakes", and "Other Streams", overlap both areas. An attempt has been made to segregate those estimates into components for each management area.

DIVERSITY OF ANGLING OPPORTUNITY WITHIN THE LTMA

Angling within the LTMA occurs at numerous lakes, ponds, and streams. Some are accessible directly from the road system. Most of these road-accessible waters have some sort of a boat launch accommodating watercraft appropriate to the size and characteristics of the waterbody. Access to off-road waters can be through a short walk, overland use of all terrain vehicles (ATVs), snowmachines, cross-country skis, or sled dogs (in which frozen rivers and lakes are added to the pathways), boats, and light aircraft suitable for landing on rough strips or gravel bars or equipped with floats or skis.

Fishing guides, outfitters, and transporters take anglers to areas of better quality fishing. Most such transport is by aircraft or boat. Some commercial operators provide cabins or some sort of shelter, and boats for angler use. There were no commercial enterprises characterizing themselves as fishing lodges in the LTMA in 2000 - 2001.

Indigenous (wild stocks) and introduced (produced in hatcheries and stocked) fish are available to anglers. There are 18 fish species indigenous to the Tanana River drainage. Ten of those are commonly targeted by sport anglers, and all occur within the LTMA. They include: Chinook salmon *Oncorhynchus tshawytscha*, coho salmon *Oncorhynchus kisutch*, chum salmon *Oncorhynchus keta*, Arctic grayling *Thymallus arcticus*, burbot *Lota lota*, lake trout *Salvelinus namaycush*, sheefish (inconnu) *Stenodus leucichthys*, least cisco *Coregonus sardinella*, humpback whitefish *Coregonus pidschian*, and northern pike *Esox lucius*. Dolly Varden char *Salvelinus malma*, round whitefish *Prosopium cylindraceum* and broad whitefish *Coregonus nasus* are taken occasionally by anglers. Longnose suckers *Catostomus catostomus*, Alaska blackfish *Dallia pectoralis*, lake chub *Couesius plumbeus*, slimy sculpins *Cottus cognatus* and

Arctic lamprey *Lampetra japonica* are present but not targeted by anglers. Suckers and lampreys are sometimes used for bait.

Rainbow trout *Oncorhynchus mykiss* are not native to the drainage, but have been stocked in many locations. Arctic char *Salvelinus alpinus*, coho salmon, Chinook salmon, and Arctic grayling, are also stocked in selected waters of the Tanana River drainage. Lake trout are no longer available from hatcheries.

Angling opportunity is available year-round, subject to regulations which include some area-specific seasonal closures. Fishing may occur in all waters where game fish are present during the summer. Winter effort focuses on stocked lakes, with some effort directed toward lake and river populations of burbot and northern pike.

REGULATIONS AND REGULATORY ACTIONS

Area Regulations (for the LTMA)

Regulations for the Tanana drainage sport fisheries are codified in Chapters 70 and 75 of Title 5 of the Alaska Administrative Code (5 AAC 70 and 5 AAC 75). Along with appropriate Statewide Regulations and other information they are summarized and simplified in a sport fishing regulation booklet for distribution to the angling public.

Appendix A of this report contains a version of the general sport fishing regulations for the Tanana River drainage and the specific regulations that apply to the LTMA. Most statewide regulations are not included. **The version of the regulations appearing in this report have been edited to remove references to and regulations for the Upper Tanana River Drainage Management Area (UTMA) and are included in this report to provide reference to fisheries management actions and regulation changes in the LTMA in this and in future reports. Under no circumstances should they be copied from this report and used as a reference by anglers.**

2000-2003 Regulatory Actions and Anticipated Future Actions

During 2000 and early 2001, EO 3-WF-03-96 remained in effect (Table 1). Issued on 8/30/96, it closed the Chatanika River to the retention of whitefish. Whitefish stocks in the Chatanika River had not recovered such that they could sustain a general spearfishery harvest. In January 2001, the BOF amended the regulations pertaining to the Chatanika River whitefish sport fishery, and consequently EO 3-WF-01-01 was issued, rescinding EO 3-WF-03-96.

On May 1, 2000, EO 3-NP-01-00 was issued closing northern pike fishing in Harding Lake until further notice, pending BOF action. In January 2001, the BOF amended the regulations pertaining to the Harding Lake northern pike sport fishery, closing pike fishing. Consequently 3-NP-01-01 was issued, rescinding 3-NP-01-00.

In July 2001, it again appeared likely that Chinook and chum salmon returns to the Yukon River drainage were very poor. In anticipation of the need to ensure maximum potential spawning escapement, personal use fishing in the Tanana River was closed. Retention of Chinook salmon by sport anglers was prohibited by EO 3-KS-04-01 on July 7, 2001, and chum salmon sport fishing was closed by EO 3-CS-01-01, all in the Tanana River. Subsistence fishing for salmon was severely restricted.

Table 1.—Emergency orders issued for Lower Tanana River Management Area sport fisheries 1995 - 2003.

Year	E. O. Number	Explanation
1995	3-WF-03-95	Closure of Chatanika River to whitefish sport fishing.
1996	3-AG-01-96	Closes Piledriver Slough and 23 Mile Slough to the retention of Arctic grayling.
1996	3-WF-03-96	Closes the Chatanika River to whitefish sport fishing.
1998	3-S-03-98	Restricts Chena, Salcha, and Chatanika rivers to catch-and-release for Chinook and chum Salmon.
1998	3-CS-04-98	Closes chum salmon sport fishing throughout Tanana drainage.
2000	3-NP-01-00	Closes northern pike fishing in Harding Lake.
2000	3-KS-05-00	Closes salmon fishing in the Tanana drainage.
2000	3-CS-01-00	Closes Fall chum salmon sport fishing in the Yukon drainage.
2001	3-NP-01-01	Rescinds EO closure for Harding Lake northern pike (in response to BOF action closing fishery).
2001	3-WF-01-01	Rescinds EO closure for Chatanika River whitefish (in response to BOF action regulating fishery more conservatively).
2001	3-KS-04-01	Prohibits retention of Chinook salmon by sport anglers in the Tanana drainage.
2001	3-KS-06-01	Opens Chena and Salcha rivers for Chinook salmon harvest.
2001	3-CS-01-01	Closes chum salmon sport fishing throughout the Tanana River drainage.
2002	3-KS-03-02	Reduces Bag Limit to 1 Chinook salmon or 1 chum salmon per day in the entire Yukon drainage.
2003	3-KS-05-03	Increases Chinook salmon sport bag limit to 3 in the Chena and Salcha rivers.
2003	3-CS-02-03	Closes chum salmon sport fishing in the entire Yukon drainage.
2003	3-CS-03-03	Reopens chum salmon sport fishing in the entire Yukon drainage.

On July 20, 2001, in response to run strength meeting management goals, EO 3-KS-06-01 was implemented, restoring the opportunity to harvest Chinook salmon in the Chena and Salcha rivers.

Generally poor chum salmon returns and Yukon River Chinook salmon are reflected in the 2002 EO which had the effect of reducing the chum salmon bag limit in the LTMA but leaving the Chinook salmon limit the same. Chinook returns in the Tanana drainage were stronger than in the Yukon drainage in general.

Strong 2003 Chinook returns in excess of escapement goals permitted the issuance of EO 3-KS-05-03 increasing the bag limit to 3 daily in the Chena and Salcha rivers. Mixed information developed for the Yukon River chum salmon escapement resulted in a pair of EOs first closing, then re-opening chum salmon sport fishing.

STATE BOARD OF FISHERIES

Meetings of the Alaska BOF to consider regulatory issues pertaining to the AYK regulatory area and the Tanana River drainage took place in Anchorage during November 8 - 18, 1994 and in Fairbanks during December 2-9, 1997. During the 1994 meeting the BOF took three actions specific to the LTMA. They adopted regulations designed to establish Little Harding Lake as a fishery for large rainbow trout; they standardized the opening date at June 1 for the LTMA grayling fisheries subject to spring catch-and-release restrictions; and they extended the 12 inch minimum harvest length limit for grayling to cover the entire Chatanika River drainage. During the 1997 meeting the BOF actions specific to the LTMA were: to adopt a Minto Flats Northern Pike Management Plan; to extend the season for northern pike fishing on certain remote lakes; and to align the area of the Chatanika River closed to chum salmon fishing with the area closed for Chinook salmon fishing.

The most recent BOF meeting to address proposals regarding Tanana drainage sport fisheries took place during January 9 - February 2, 2001, in Anchorage. Lower Tanana Drainage Management Area issues that were addressed at that meeting include a refinement of the Minto Flats Northern Pike Management Plan, management of sport fisheries to ensure that Chinook salmon escapement objectives are met in the Salcha and Chena rivers, clarification of catch-and-release regulations for grayling, restructuring the Chatanika River whitefish fishery to allow some harvest, a more restrictive bag and size limit for lake trout in Harding Lake, a reduced bag limit and a size limit for rainbow trout in Dune Lake, and the closing of northern pike fishing in Harding Lake. In all cases the BOF agreed with the department and accepted the regulation proposals. The regulatory proposals and staff comments can be found in Appendix B of the 2001 LTMA AMR (Doxey 2001). The regulation summary in this report contains the new regulatory language passed by the BOF in January, 2001.

The BOF is meeting during January 2004 to consider regulations for all of Region III except the UCUS Area. Four proposals impacting LTMA fisheries are being considered:

Proposal 107 – Stocked Waters Management Plan for the Arctic–Yukon–Kuskokwim Area. A department proposal asking the BOF to adopt a plan which categorizes and groups stocked waters fisheries, and provides consistent regulatory and management options for them.

Proposal 109 – Management Plan for Arctic Grayling for the A-Y-K Area. A department proposal asking the BOF to adopt a plan which categorizes and groups wild stock Arctic grayling fisheries, and provides consistent regulatory and management options for them.

Proposal 117 – A proposal from the Fairbanks Fish and Game Advisory Committee to allow harvest of Arctic grayling in the Chena River from the Nordale Road Bridge downstream.

Proposal 119 – A proposal from the Big Delta Fish and Game Advisory Committee to do away with the registration system for ice fishing shanties (ice houses) and replace it with a requirement that the owners put their name and phone number, or Alaska I.D. number on the side of the ice house.

Proposal 165 – A proposal to close the mouth areas of “spawning streams” in the Yukon drainage to all fishing until (salmon) escapement goals have been defined and achieved each season.

Proposal 174 – To place sport fisheries on a schedule of openings and closures aligned with subsistence fishing schedules.

Staff comments for these proposals are found in Appendix B.

FISH AND GAME ADVISORY COMMITTEES

A total of four Advisory Committees represent resource users in the LTMA: Fairbanks, Minto/Nenana, Middle Nenana River, and Lake Minchumina. During 2001 - 2003 Region III Sport Fish Division staff attended meetings of the Fairbanks and Minto/Nenana Advisory Committees. During 2003 the regulation change proposals for the January, 2004 BOF meeting were discussed with the Fairbanks Advisory Committee (Minto/Nenana and Middle Nenana River did not consider any of the four the sport fisheries proposals). The Fairbanks Fish and Game Advisory Committee is asking that the BOF allow them to withdraw proposal 117. The AC received little public support for it and the department provided input to the effect that timing of such proposal could be geared to adoption and implementation of Proposal 109. The AC supported the concepts of proposals 107 and 109, and opposed proposal 119.

FEDERAL SUBSISTENCE

The LTMA lies within the boundaries of the Eastern Interior Regional Advisory Council (EIRAC). There is a very small proportion of Federal Land outside of parklands within the LTMA that is within the jurisdiction of the EIRAC. So far no federal fisheries issues have arisen within that area.

MANAGEMENT PLANS

The Region III management staff began drafting Fishery Management Plans in 1992 for important fisheries. The plans went through a public review and comment process and were finalized. With the exception of the Minto Flats Northern Pike Management Plan, none of these plans involved specific management strategies requiring new regulations or BOF action. Finalized plans are subject to revision. A few of the plans have been formally reviewed and revised, and some in-house revisions of plans for stocked lakes have occurred and some management strategies have been changed by the division or BOF outside of the written management plan process. Managers use the plans as planning and evaluation tools, but the utility of the plans can decline as time passes without review and updating.

At the 2001 BOF meeting, the Board accepted the department recommendation to revise the Minto Flats Northern Pike Management Plan, more clearly defining the geographic area and stock of northern pike covered by the plan. In late 2001 a draft interim management plan for Chena River grayling and a Restoration and Management Plan for Harding Lake northern pike

were produced. These three will be discussed in the pertinent fisheries sections. The Chena grayling planning process was slowed so that it will be reviewed and finalized after the overall proposed grayling management strategy (Proposal 109) is acted upon by the BOF.

Two major planning efforts have been undertaken on a Regional basis, culminating in proposals 107 and 109. If adopted by the BOF, stocked waters fisheries and wild stock grayling fisheries will be integrated into management plans by category. The plans will have default sets of regulations covering the fisheries.

In 2002, all of the LTMA fisheries management plans, including the older, somewhat generic fisheries management plans described in Doxey, 2001 not adopted into regulation by the BOF, were reviewed, and recommendations were made for continuing, revising or in some cases “sunsetting” them, and recommendations were made for drafting of new plans.

A listing of plans, explanations, and recommendations follows:

Recently written or adopted plans:

- A. Draft Interim Fishery Management Plan for the Chena River Arctic Grayling Sport Fishery, (Dates flexible contingent upon finalization process).** Detailed description of options for managing the Chena River grayling fishery, based on stock assessment, conservation concerns and a public planning process.
- B. Fishery Management and Restoration Plan for the Harding Lake Northern Pike Sport Fishery, 2001–2004** (Jan 2002). Detailed course of action restoring opportunity to catch and ultimately harvest northern pike in Harding Lake as abundance increases.
- C. Minto Flats Northern Pike Management Plan,** (5 AAC 70.044, adopted in 1997 and amended in 2001 by BOF). Sets northern pike harvest limit for Minto Lakes and Lower Chatanika at 20% of northern pike abundance of Minto Lakes area. Very short regulatory statement.
- D. Chena and Salcha River King Salmon Sport Harvest Management Plan** (5 AAC 70.060, adopted in 2001 by BOF) Directs management of Chinook Sport fisheries to attain BEGs by making adjustments to harvest amounts and fishing restrictions by EO according to inriver abundance and subsistence restrictions in the Tanana River drainage. Very short regulatory statement.

Older Fisheries Management Plans "on the books" as of 2002:

- I. Piledriver Slough Sport Fishery Enhancement, June 1992 (all species; focused on grayling, stocking component amended periodically).
- II. Chatanika River Sport Fishery Management Plan, November 1992 (all species).
- III. East Twin Lake Sport Fishery Management Plan, April 1993 (pike only).
- IV. Minto Flats Sport Fishery Management Plan, April 1993 (all species).
- V. Recreational Fishery Management Plan for Chinook Salmon in the Chena River, May 1993.
- VI. Recreational Fishery Management Plan for Chinook Salmon in the Salcha River, May 1993.
- VII. Recreational Fishery Management Plan for Arctic Grayling in the Salcha River, June 1993.
- VIII. Harding Lake Sport Fishery Management Plan, June 1993 (all species, stocking component amended periodically).
- IX. Tanana River Burbot Sport Fishery Management Plan, June 1993 (*includes both the UTMA and LTMA*).
- X. Chena River Arctic Grayling Conservation and Rehabilitation Plan, December 1993.

The Older Plans generally each have some of the following elements:

(Language of the elements is paraphrased, but is pretty close to verbatim.)

- **To maintain the fishery at or below a level of sustainable fishing mortality**
 - Ensure that the hooking mortality (if catch-and-release) and that harvest and incidental mortality of the targeted species or of all indigenous gamefish species is sustainable.
 - A recommended fishing mortality exploitation rate which should not be exceeded.

- **To rebuild, maintain, or increase participation to a specified level**

To manage the fishery in a manner that allows the fishery to rebuild to the average level that occurred during a previous period.

To provide a given number or more (angler) days of recreational fishing annually on a targeted fishery or species.

To increase participation in the recreational fishery from current levels to a higher specified number of angler days.

To allow the fishery (in angler days) to approximately double from the average of a previous period of years.

- **To maintain opportunity**

To maintain current levels of fishing opportunity in the targeted fishery.

- **To maintain cost-effectiveness**

To ensure that public benefits derived from the fishery outweigh the costs of fishery management.

- **To maintain access**

To maintain public access to the area or fishery for the benefit of recreational anglers.

Management Plan Recommendations:

While many of the objectives listed above are legitimate objectives, they can be applied to all sport fisheries, and as generic objectives not addressing specific needs within a fishery can better be left unsaid.

Older plans should be sunsetted, or "deactivated" and set aside for future use, or combined with newer plans and/or upgraded to contemporary standards as follows:

Sunsetted (all from old plans):

Minto Flats Sport Fishery Management Plan. The northern pike issues have been addressed by the BOF. The only species that might need additional consideration are sheefish, which would be addressed in an area wide plan. Plans for whitefish and grayling (if written) will focus on Chatanika stocks.

Chena River Arctic Grayling Conservation and Rehabilitation Plan. Superseded by new draft plan.

Recreational Fisheries Management Plan(s) for Chena/Salcha Chinook Salmon. Superseded by board action and new plan.

Recommended actions to combine or otherwise upgrade existing plans:

Chena and Salcha River King Salmon Sport Harvest Management Plan. Combine regulatory language with appropriate Staff/BOF language from the 2001 BOF meeting deliberation materials and reports, and with in-season management strategy, in short statement of process.

Minto Flats Northern Pike Management Plan. Combine regulatory language and staff /BOF comments and evaluation/management language from 2001 BOF meeting deliberation materials and reports in short statement of process.

Piledriver Slough Sport Fishery Enhancement. Plan is presently focused on wild stock of grayling and stocked catchable (triploid) rainbow trout. Fish are extremely accessible to anglers and habitat availability is threatened by beaver dams and eutrophication. The grayling fishery is restricted to catch-and-release for conservation reasons. Recommended new title is **Piledriver Slough Grayling and Rainbow Trout Sport Fishery Management Plan.** The plan should address habitat issues as well as fisheries specifics. Plans for other species in Piledriver Slough can be written as needed.

Chatanika River Sport Fishery Management Plan. The upper river provides a largely road-accessible grayling fishery. The plan should be re-written as **Chatanika River Arctic Grayling Sport Fishery Management Plan** as the Regional Grayling Planning Strategy is developed and additional information is gathered through research and assessment. A separate approach should be taken to address the whitefish fishery. The existing thresholds for opening a spear fishery for whitefish in the Chatanika River (abundances of 10,000 humpback whitefish and 40,000 least ciscos) should be reviewed. Plans for other species in Chatanika can be written as needed.

Recreational Fishery Management Plan for Arctic Grayling in the Salcha River. The plan should be upgraded as the Regional Grayling Planning Strategy is developed and additional information is developed through research and assessment.

Plans to be deactivated and set aside:

East Twin Lake Sport Fishery Management Plan. Deactivated and set aside until plan is needed for Kantishna/Lower Tanana Lake-resident Pike fisheries in general.

Harding Lake Sport Fishery Management Plan. Northern pike are the focus of a separate plan; Arctic char are addressed in the stocking plans; and lake trout and burbot are conserved by regulatory restrictions. This plan for the combined Harding Lake Fishery is deactivated and set aside until there is demonstrated need for additional planning process.

Tanana River Burbot Sport Fishery Management Plan. Deactivated and set aside. An effort objective drives the potential harvest objective, which seems to be to maximize whole river harvest. Setting effort objectives within mixed stock fisheries is difficult.

SECTION II: LOWER TANANA RIVER DRAINAGE MANAGEMENT AREA OVERALL EFFORT AND HARVEST DATA AND ECONOMIC INFORMATION

DATA MANAGEMENT

In preparation for the development of this report, SWHS estimates of effort, catch, and harvest for the entire Tanana River drainage were segregated into separate sets of estimates for the UTMA and LTMA. The beginning of timelines for estimates presented in this report vary depending on when it was possible to sensibly break out the LTMA information. Some begin with the first reported estimates in 1977. Many begin in 1983, when increasingly detailed estimates became available covering more individual waters. In 1990 both catch and harvest estimates were produced (for 1977 - 1989 only harvest was evaluated). Because of this and the relevance to the present status of the fisheries or more recent estimates, considerable emphasis is placed on estimates from 1990 to present. Some estimates may differ slightly from SWHS reported results because of computational modifications when the segregation was undertaken or because adjustments were made to estimates by RTS after tables were composed for the AMR.

SPORT ANGLER EFFORT IN THE LTMA

From 1992 through 2001, anglers in the LTMA have expended an annual average of 102,270 days fished (about 5% of the total statewide effort; Table 2). The 5-year (1997 - 2001) average effort for the LTMA (87,589 angler days) is about 36% of the 5-year average for Region III. The heavy contribution of LTMA fisheries to Region III effort totals is a function of higher human population density in the Tanana River Valley. In 2002 an estimated 25,965 anglers fished in the LTMA, 123% of the 5-year average of 21,169 anglers.

The transfer of authority over the Upper Copper/Upper Susitna Management Area (UCUS) from Region II to Region III (RIII) in 1997 caused a decline in the proportion of total effort, catch, and harvest that the other management areas contributed to the overall Region III production.

Overall effort in the LTMA has ranged from about 60,000 to about 160,000 days fished. While factors driving the variation in estimated effort are unclear, some components include weather, timing of breakup and freeze-up, river stages, and EOs.

SPORT FISH CATCH AND HARVEST

From 1983 through 2002, anglers in the LTMA harvested an estimated 1,469,251 fish, accounting for of 6.8% of the estimated statewide recreational freshwater fish harvest for that period and about 40% of the total estimated Region III harvest for the same period (Table 3). Five-year (1997–2001) average harvest was less than the 10-year (1992-2001) and long-term (1983–2001) average harvest, but the 2002 harvest was substantially above the 5 year harvest.

The proportion of the LTMA harvest within the total Region III harvest declined due to the addition of the UCUS Area to Region III in 1997. An overall declining trend since 1990 may be stabilizing with 2002 harvest of about 67,000 fish, the highest since 1991. Restrictive regulations are partially responsible for the long term declines in Tanana drainage harvests, but it must be remembered that those regulations are in place to conserve stocks that were observed to be declining. Had regulations not been implemented, harvest would have likely declined in any case with the probable continued decline in the stocks. Another possible reason for declines in

Table 2.-Number of angler days of sport fishing effort expended by recreational anglers fishing LTMA waters, 1983-2002.

Year	LTMA Effort	Statewide Effort	LTMA Percent of Statewide	Region III Effort	LTMA Percent of Region III
1983	103,153	1,732,528	6%	199,125	52%
1984	103,868	1,866,837	6%	199,041	52%
1985	91,338	1,943,068	5%	186,883	49%
1986	103,885	2,071,412	5%	194,713	53%
1987	106,654	2,152,866	5%	217,109	49%
1988	126,135	2,311,291	5%	233,559	54%
1989	139,223	2,264,079	6%	239,626	58%
1990	133,365	2,453,284	5%	245,629	54%
1991	106,959	2,456,328	4%	219,922	49%
1992	81,378	2,540,374	3%	181,852	45%
1993	103,713	2,559,408	4%	220,972	47%
1994	99,906	2,719,911	4%	239,626	42%
1995	141,231	2,787,670	5%	270,141	52%
1996	159,027	2,006,528	8%	201,166	70%
1997	89,911	2,079,514	4%	238,856	38%
1998	81,789	1,856,976	4%	227,841	36%
1999	114,592	2,499,152	5%	304,522	38%
2000	87,451	2,627,805	3%	241,574	36%
2001	63,702	2,261,941	3%	194,138	33%
2002	78,499	2,259,091	3%	220,276	36%
Total: 1983-2002	2,072,243	45,450,063	5%	4,476,571	46%
Average 1983-2002	103,612	2,300,923	5%	225,129	46%
10 year Average 1992-2001	102,270	2,393,928	4%	232,069	44%
5 Year Average 1997-2001	87,589	2,265,078	4%	241,386	36%
2002 as % of 5-Year Avg.	90%	100%		91%	

Table 3.-Total number of fish harvested by recreational anglers from LTMA waters, compared to Region III and Statewide Freshwater Harvest, 1983-2002.

Year	LTMA Harvest	Region III Harvest	LTMA as a % of Region III Harvest	Statewide Freshwater Harvest	LTMA as a % of Statewide Harvest
1983	109,547	274,086	39.97%	1,242,931	8.81%
1984	121,755	245,083	49.68%	1,310,626	9.29%
1985	105,453	241,109	43.74%	1,317,552	8.00%
1986	97,155	216,826	44.81%	1,245,380	7.80%
1987	90,174	201,677	44.71%	1,415,901	6.37%
1988	113,150	264,371	42.80%	1,457,934	7.76%
1989	119,605	253,437	47.19%	1,502,163	7.96%
1990	75,186	174,175	43.17%	1,185,603	6.34%
1991	83,237	221,164	37.64%	1,282,541	6.49%
1992	47,466	131,486	36.10%	1,213,618	3.91%
1993	63,490	151,551	41.89%	1,087,651	5.84%
1994	52,501	152,676	34.39%	1,063,871	4.93%
1995	59,741	118,473	50.43%	852,700	7.01%
1996	58,414	156,333	37.37%	1,073,281	5.44%
1997	45,676	161,500	28.28%	942,274	4.85%
1998	37,789	165,771	22.80%	976,926	3.87%
1999	45,216	169,675	26.65%	1,078,643	4.19%
2000	49,783	174,549	28.52%	1,218,315	4.09%
2001	26,587	121,780	21.83%	1,065,666	2.49%
2002	67,326	163,459	27.66%	1,079,523	6.24%
Total: 1983-2002	1,469,251	3,759,181	39.08%	23,613,099	6.79%
Average 1983-2002	73,463	187,959	39.08%	1,180,655	6.41%
10 year Average 1992-2001	48,666	150,379	32.36%	1,057,295	5.09%
5 Year Average 1997-2001	41,010	158,655	25.85%	1,056,365	5.03%
2002 as % of 5-Year Avg.	164.17%	103.03%		102.19%	

harvest is the growing angler tendency to release the catch, although harvest rate (discussed below) is a better indication of this. And finally, effort and harvest tend to drive each other, so harvest can decline in years with lower effort.

Arctic grayling and rainbow trout dominated the catch and harvest from LTMA waters in 2000 - 2002, with both species together providing about 60 - 80% of total catch of all species and rainbow trout providing about 45 - 60% of the harvest (Tables 4a, 4b, 4c). Chinook, coho, and chum salmon, and whitefish were the least important proportionally.

Some catch and harvest trends are apparent in Table 5. Increases in the harvest of Chinook salmon in the 1990s reflect increasing angler interest in the fisheries, dampened by EOs in 1998 and 2000. Decreases in grayling harvest over time are a result of regulatory restrictions. Declining catch and harvest of whitefish reflects the closure of the Chatanika River spearfishery and to a certain extent restrictions on the use of bait in grayling fisheries, particularly in the Chena River. Changes in catch and harvest of rainbow trout and landlocked salmon from one year to the next may reflect changes in angler satisfaction with the size of these stocked species (which may drive both release rate and effort), since number stocked and number of waters stocked is somewhat stable. Catch and harvest of Arctic char, a stocked species, is gradually increasing as densities of this long-lived species increase and anglers become more knowledgeable about fishing techniques for them.

PROPORTIONAL CONTRIBUTION OF SPECIES TO LTMA TOTALS

While Tables 4 and 5 provide information on magnitude of catch and harvest and trends within and between fisheries, Tables 6 and 7 provide a more focused measure of relative importance between fisheries for species as they contribute to the overall catch and harvest within the LTMA. Assumptions based on these tables must carefully take into consideration the characteristics of the fisheries; however, long-term average Arctic grayling contribution to overall catch has generally about twice that of rainbow trout (Table 6), but grayling take in winter is insignificant. Stocked species are taken year-round, with liberal harvest limits, and the stocked rainbow trout, landlocked salmon, and Arctic char are the foundation of the ice fisheries. Wild stocks support very little winter fishing. Similarly, while catch of Chinook salmon has never exceeded 3% of the total LTMA catch, the size of the fish and the overall fishing experience makes them highly desirable to anglers and economically important during the short period of availability.

Proportional contribution to total harvest (Table 7) shifts the proportions between species when compared to Table 6. Proportions of stocked species demonstrate not only the importance of year-round availability but of more liberal harvest regulations, giving anglers the opportunity to take something home to eat. About half of the harvest is from stocked species. However, this table simply provides numerical comparisons based on relative estimated numbers of harvested fish. As with Table 6, characteristics of fisheries for species demand some consideration. Sea - run salmon, northern pike, lake trout, burbot, and sheefish are large fish, and the enjoyment of catching them coupled with the relatively larger body size for consumption makes them more important than their lower contribution to overall harvest implies.

Table 4a.-Angler catch and harvest from LTMA waters during 2000, percent harvested, and species contribution to LTMA total.

Species	Catch ^a	Harvest	Percent Harvested	Species Contribution to LTMA Total	
				Catch ^a	Harvest
<u>Anadromous Salmon:</u>					
Chinook	527	178	34%	0.22%	0.36%
Coho	447	40	9%	0.19%	0.08%
Chum	278	85	31%	0.12%	0.17%
<u>Resident and Stocked Species:</u>					
Rainbow Trout	94,929	30,016	32%	40.19%	60.29%
Landlocked Salmon	20,655	6,266	30%	8.74%	12.59%
Lake Trout	1,235	517	42%	0.52%	1.04%
Char ^b	6,866	2,527	37%	2.91%	5.08%
Arctic Grayling	92,462	4,829	5%	39.15%	9.70%
Northern Pike	13,585	2,793	21%	5.75%	5.61%
Whitefish	847	313	37%	0.36%	0.63%
Burbot	3,312	2,032	61%	1.40%	4.08%
Sheefish	312	187	60%	0.13%	0.38%
Total	235,455	49,783	21%		

^a Catch = Total (number released + number harvested).

^b Includes Arctic char and Dolly Varden.

Table 4b.-Angler catch and harvest from LTMA waters during 2001, percent harvested, and species contribution to LTMA total.

Species	Catch ^a	Harvest	Percent Harvested	Species Contribution to LTMA Total	
				Catch ^a	Harvest
<u>Anadromous Salmon:</u>					
Chinook	2,414	667	28%	1.64%	2.51%
Coho	892	180	20%	0.60%	0.68%
Chum	661	29	4%	0.45%	0.11%
<u>Resident and Stocked Species:</u>					
Rainbow Trout	37,391	11,811	32%	25.33%	44.42%
Landlocked Salmon	12,719	5,085	40%	8.62%	19.12%
Lake Trout	1,299	209	16%	0.88%	0.79%
Char ^b	5,688	1,632	29%	3.85%	6.14%
Arctic Grayling	71,227	2,692	4%	48.26%	10.13%
Northern Pike	13,117	3,296	25%	8.89%	12.40%
Whitefish	883	221	25%	0.60%	0.83%
Burbot	1,265	759	60%	0.86%	2.85%
Sheefish	41	7	17%	0.03%	0.03%
Total	147,597	26,587	18%		

^a Catch = Total (number released + number harvested).

^b Includes Arctic char and Dolly Varden.

Table 4c.-Angler catch and harvest from LTMA waters during 2002, percent harvested, and species contribution to LTMA total.

Species	Catch ^a	Harvest	Percent Harvested	Species Contribution to LTMA Total	
				Catch ^a	Harvest
<u>Anadromous Salmon:</u>					
Chinook	3,206	466	15%	1.24%	0.69%
Coho	270	24	9%	0.10%	0.04%
Chum	1,007	307	30%	0.39%	0.46%
<u>Resident and Stocked Species:</u>					
Rainbow Trout	69,374	29,609	43%	26.77%	43.98%
Landlocked Salmon	30,953	14,528	47%	11.94%	21.58%
Lake Trout	1,044	88	8%	0.40%	0.13%
Char ^b	9,151	4,392	48%	3.53%	6.52%
Arctic Grayling	119,845	11,101	9%	46.24%	16.49%
Northern Pike	19,646	3,043	15%	7.58%	4.52%
Whitefish	1,247	936	75%	0.48%	1.39%
Burbot	3,371	2,787	83%	1.30%	4.14%
Sheefish	50	45	90%	0.02%	0.07%
Total	259,165	67,326	26%		

^a Catch = Total (number released + number harvested).

^b Includes Arctic char and Dolly Varden .

Table 5.-Number and species of fish caught and harvested by recreational anglers from LTMA waters, 1983-2002.

Year	Anadromous Salmon						Resident and Stocked Species					
	Chinook		Coho		Chum		Rainbow Trout		Landlocked Salmon		Lake Trout	
	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1983	N/A	992	N/A	84	N/A	582	N/A	18,009	Catch	10,048	N/A	31
1984	N/A	338	N/A	158	N/A	351	N/A	26,296	N/A	11,929	N/A	559
1985	N/A	1,356	N/A	25	N/A	1023	N/A	20,150	N/A	14,278	N/A	46
1986	N/A	788	N/A	281	N/A	496	N/A	15,967	N/A	7,165	N/A	45
1987	N/A	492	N/A	0	N/A	578	N/A	19,865	N/A	9,984	N/A	109
1988	N/A	399	N/A	461	N/A	236	N/A	43,398	N/A	11603	N/A	
1989	N/A	460	N/A	493	N/A	969	N/A	39,685	N/A	8,490	N/A	567
1990	1,310	420	688	269	301	50	90,248	35,377	16,951	6,566	715	226
1991	1,197	630	1,900	443	588	385	82,345	40,039	16,417	10,604	545	461
1992	204	118	760	198	1,199	373	57,907	20,164	15,424	6,836	1,935	380
1993	5,017	1,691	291	29	2,135	317	82,695	27,976	9,952	5,976	955	412
1994	2,609	1,832	946	539	1,131	244	53,518	17,014	10,242	3,645	461	117
1995	5,675	2,419	1,130	593	2,828	1,252	59,254	18,743	10,140	3,497	702	258
1996	8,676	3,095	1,961	348	8,246	1,731	115,218	34,382	13,682	5,094	1,262	271
1997	6,566	1,943	1,264	342	1,697	456	68,025	21,516	11,967	3,701	1,029	348
1998	1,480	441	550	125	1,039	64	63,327	19,200	18,005	4,867	443	51
1999	3,435	1,006	331	141	1,654	388	79,297	27,067	10,025	2,590	1,118	384
2000	527	178	447	40	278	85	94,929	30,016	20,655	6,266	1,235	517
2001	2,414	667	892	180	661	29	37,391	11,811	12,719	5,085	1,299	209
2002	3,206	466	270	24	1,007	307	69,374	29,609	30,953	14,528	1,044	88
Total: 1983-2002	42,317	14,907	11,430	3,271	22,766	5,681	953,528	332,915	197,131	79,255	12,744	3,722
Average 1983-2002	3,255	1,147	879	252	1,751	437	73,348	25,609	15,164	6,097	980	286
10 Year Average 1992-2001	3,660	1,339	857	253	2,087	494	71,156	22,789	13,281	4,756	1,044	295
5 Year Average 1997-2001	2,884	847	697	166	1,066	205	68,594	21,922	14,674	4,502	1,025	302
2002 as % of 5-Year Avg.	111%	55%	39%	14%	94%	150%	101%	135%	211%	323%	102%	29%

-continued-

Table 5.-Page 2 of 2

Year	Resident and Stocked Species													
	Char ^a		Grayling		Northern Pike		Whitefish		Burbot		Sheefish		Total ^b	
	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1983	N/A	212	N/A	60,748	N/A	7,898	N/A	7,436	N/A	3,350	N/A	157	N/A	109,547
1984	N/A	13	N/A	61,560	N/A	6,357	N/A	10,742	N/A	3,131	N/A	320	N/A	121,754
1985	N/A	1,171	N/A	36,711	N/A	8,824	N/A	18,840	N/A	3,566	N/A	385	N/A	106,375
1986	N/A	37	N/A	30,398	N/A	8,112	N/A	26,995	N/A	6,618	N/A	53	N/A	96,955
1987	N/A	30	N/A	24,723	N/A	6,105	N/A	25,937	N/A	2,128	N/A	223	N/A	90,174
1988	N/A	418	N/A	36,489	N/A	7,599	N/A	9,123	N/A	1922	N/A	770	N/A	112,697
1989	N/A	682	N/A	39,407	N/A	8,310	N/A	16,688	N/A	2,969	N/A	403	N/A	119,123
1990	1,873	557	122,342	17,732	23,964	5,414	8,014	6,299	2,701	2,207	255	68	269,361	75,185
1991	2,705	909	98,562	18,503	23,037	9,426	551	356	1,920	1,323	203	158	229,970	83,237
1992	5,151	1,597	78,820	8,275	24,477	4,200	3,140	2,810	2,964	2,368	612	148	192,594	47,467
1993	6,962	3,536	127,383	11,377	41,809	7,743	948	722	4,164	3,547	190	164	282,500	63,490
1994	2,923	1,129	171,968	11,826	76,372	13,200	1,677	242	3,154	2,551	267	163	325,269	52,501
1995	5,650	2,140	105,251	16,291	43,325	10,834	1187	578	4113	2,936	482	200	239,737	59,741
1996	6,139	1,963	123,971	5,073	34,867	4,890	660	149	1,935	1,378	219	40	316,837	58,414
1997	6,815	1,820	204,338	8,598	19,186	2,320	1,404	773	4,935	3,824	486	35	327,712	45,677
1998	5,898	2,528	179,855	5,914	12,964	2,003	1,115	490	2,832	2,088	79	17	287,586	37,789
1999	7,516	2,507	157,762	6,729	10,641	2,013	976	219	3,195	2,049	173	121	276,123	45,216
2000	6,866	2,527	92,462	4,829	13,585	2,793	847	313	3,312	2,032	312	187	235,455	49,783
2001	5,688	1,632	71,227	2,692	13,117	3,296	883	221	1,265	759	41	9	147,597	26,589
2002	9,151	4,392	119,845	11,101	19,646	3,043	1,247	936	3,371	2,787	50	45	259,165	67,326
Total: 1983-2002	73,337	27,238	1,653,785	128,940	356,992	71,175	22,648	14,108	39,860	29,850	3,369	1,346	3,389,905	712,406
Average 1983-2002	5,641	2,095	127,214	9,918	27,461	5,475	1,742	1,085	3,066	2,296	259	104	260,762	54,800
10 Year Average 1992-2001	5,961	2,138	131,304	8,160	29,034	5,329	1,284	652	3,187	2,353	286	107	263,141	48,666
5 Year Average 1997-2001	6,557	2,203	141,129	5,753	13,898	2,485	1,045	403	3,108	2,151	218	72	254,894	41,009
2002 as % of 5-Year Avg.	140%	199%	85%	193%	141%	122%	119%	232%	108%	130%	23%	63%	102%	164%

^a Includes Arctic char and Dolly Varden.

Table 6.-Proportional contribution of species to total LTMA catch, 1990-2002.

Year	Anadromous Salmon			Resident and Stocked Species									Total
	Chinook	Coho	Chum	Rainbow Trout	Landlocked Salmon	Lake Trout	Char	Grayling	Northern Pike	Whitefish	Burbot	Sheefish	
1990	0.49%	0.26%	0.11%	33.50%	6.29%	0.27%	0.70%	45.42%	8.90%	2.98%	1.00%	0.09%	269,361
1991	0.52%	0.83%	0.26%	35.81%	7.14%	0.24%	1.18%	42.86%	10.02%	0.24%	0.83%	0.09%	229,970
1992	0.11%	0.39%	0.62%	30.07%	8.01%	1.00%	2.67%	40.93%	12.71%	1.63%	1.54%	0.32%	192,594
1993	1.78%	0.10%	0.76%	29.27%	3.52%	0.34%	2.46%	45.09%	14.80%	0.34%	1.47%	0.07%	282,500
1994	0.80%	0.29%	0.35%	16.47%	3.06%	0.14%	0.90%	52.92%	23.50%	0.52%	0.97%	0.08%	324,979
1995	2.37%	0.47%	1.18%	24.72%	4.23%	0.29%	2.36%	43.90%	18.07%	0.50%	1.72%	0.20%	239,737
1996	2.74%	0.62%	2.60%	36.37%	4.32%	0.40%	1.94%	39.13%	11.00%	0.21%	0.61%	0.07%	316,837
1997	2.00%	0.39%	0.52%	20.76%	3.65%	0.31%	2.08%	62.35%	5.85%	0.43%	1.51%	0.15%	327,712
1998	0.51%	0.19%	0.36%	22.02%	6.26%	0.15%	2.05%	62.54%	4.51%	0.39%	0.98%	0.03%	287,586
1999	1.24%	0.12%	0.60%	28.72%	3.63%	0.40%	2.72%	57.13%	3.85%	0.35%	1.16%	0.06%	276,123
2000	0.22%	0.19%	0.12%	40.19%	8.74%	0.52%	2.92%	39.15%	5.75%	0.36%	1.40%	0.13%	235,455
2001	1.64%	0.60%	0.45%	25.33%	8.62%	0.88%	3.85%	48.26%	8.89%	0.60%	0.86%	0.03%	147,597
2002	1.24%	0.10%	0.39%	26.77%	11.94%	0.4 %	3.53%	46.24%	7.58%	0.48%	1.30%	0.02%	259,165
10-Yr Average 1992-2001	1.39%	0.33%	0.79%	27.04%	5.05%	0.40%	2.27%	49.90%	11.03%	0.49%	1.21%	0.11%	
5-Yr Average 1997-2001	1.13%	0.27%	0.42%	26.91%	5.76%	0.40%	2.57%	55.37%	5.45%	0.41%	1.22%	0.09%	

Table 7.-Proportional contribution of species to total LTMA harvest, 1990-2002.

Year	Anadromous Salmon			Resident and Stocked Species									Total
	Chinook	Coho	Chum	Rainbow Trout	Landlocked Salmon	Lake Trout	Char	Grayling	Northern Pike	Whitefish	Burbot	Sheefish	
1990	0.56%	0.36%	0.07%	47.05%	8.73%	0.30%	0.74%	23.58%	7.20%	8.38%	2.94%	0.09%	75,186
1991	0.76%	0.53%	0.46%	48.10%	12.74%	0.55%	1.09%	22.23%	11.32%	0.43%	1.59%	0.19%	83,237
1992	0.25%	0.42%	0.79%	42.48%	14.40%	0.80%	3.36%	17.43%	8.85%	5.92%	4.99%	0.31%	47,466
1993	2.66%	0.05%	0.50%	44.06%	9.41%	0.65%	5.57%	17.92%	12.20%	1.14%	5.59%	0.26%	63,490
1994	3.49%	1.03%	0.46%	32.41%	6.94%	0.22%	2.15%	22.52%	25.14%	0.46%	4.86%	0.31%	52,501
1995	4.05%	0.99%	2.10%	31.37%	5.85%	0.43%	3.58%	27.27%	18.14%	0.97%	4.91%	0.34%	59,741
1996	5.30%	0.60%	2.96%	58.86%	8.72%	0.46%	3.36%	8.68%	8.37%	0.26%	2.36%	0.07%	58,414
1997	4.25%	0.75%	1.00%	47.11%	8.10%	0.76%	3.98%	18.82%	5.08%	1.69%	8.37%	0.08%	45,676
1998	1.17%	0.33%	0.17%	50.81%	12.88%	0.13%	6.69%	15.65%	5.30%	1.30%	5.53%	0.04%	37,789
1999	2.23%	0.31%	0.86%	59.86%	5.73%	0.85%	5.54%	14.88%	4.45%	0.48%	4.53%	0.27%	45,216
2000	0.36%	0.08%	0.17%	60.29%	12.59%	1.04%	5.08%	9.70%	5.61%	0.63%	4.08%	0.38%	49,783
2001	2.51%	0.68%	0.11%	44.42%	19.12%	0.79%	6.14%	10.12%	12.40%	0.83%	2.85%	0.03%	26,589
2002	0.69%	0.04%	0.46%	43.98%	21.58%	0.13%	6.52%	16.49%	4.52%				
10-Yr Average 1991-2001	2.75%	0.52%	1.01%	46.83%	9.77%	0.61%	4.39%	16.77%	10.95%	1.39%	4.14%	0.07%	
5-Yr Average 1996-2001	2.07%	0.40%	0.50%	53.46%	10.98%	0.74%	5.37%	14.03%	6.06%	1.34%	4.84%	0.22%	

HARVEST AS A PROPORTION OF CATCH (HARVEST RATE)

Total proportion of catch that is harvested has trended downward through the years but appears to be stabilizing (Table 8). Overall harvest rate of grayling is very low, due in large part to the major contribution of the Chena River to the grayling catch (see Section VI of this report) which is entirely a catch-and-release fishery. Other major grayling fisheries are regulated by restrictions beyond the background regulations (Appendix A). Harvest rate of burbot is quite high, reflecting their desirability for human consumption.

In addition to the influence of regulations, harvest rates are driven by the relative (for the species) size of the fish available, angler preferences to keep or to not keep fish of a particular species or stock, or an overall sentiment toward all fishing. Since stocked fish provide a high proportion of the harvest (Table 7; rainbow trout and landlocked salmon), proportion of fish kept may be sensitive to size of stocked fish available.

Table 8.—Percentage of fish caught that were harvested by anglers from LTMA waters, 1995-2002.

Species	Year							5 Yr Avg	2002
	1995	1996	1997	1998	1999	2000	2001		
<u>Anadromous Salmon:</u>									
Chinook	43%	36%	30%	30%	29%	34%	28%	32%	15%
Coho	59%	18%	27%	23%	43%	9%	20%	22%	9%
Chum	44%	21%	27%	6%	23%	31%	4%	21%	30%
<u>Resident/Stocked Species:</u>									
Rainbow Trout	32%	30%	32%	30%	34%	32%	32%	31%	43%
Landlocked Salmon	34%	37%	31%	27%	26%	30%	40%	30%	47%
Lake Trout	38%	21%	34%	12%	34%	42%	16%	31%	8%
Char ^a	37%	32%	27%	43%	33%	37%	29%	34%	48%
Arctic Grayling	15%	4%	4%	3%	4%	5%	4%	4%	9%
Northern Pike	25%	14%	12%	15%	19%	21%	25%	15%	15%
Whitefish	49%	23%	55%	44%	22%	37%	25%	39%	75%
Burbot	71%	71%	77%	74%	64%	61%	60%	70%	83%
Sheefish	41%	18%	7%	21%	70%	60%	17%	32%	90%
Annual Total	25%	18%	14%	13%	16%	21%	18%	16%	26%

^a Includes Arctic char and Dolly Varden char.

ECONOMIC VALUE OF SPORT FISHERIES

Sport fisheries in the LTMA provide year-round economic benefits. The fish-stocking program is a critical contributor, since without the availability of stocked salmonids in lakes there would be very little winter fishing. Eight major department stores in the Fairbanks area and on the military bases sell fishing tackle. There are three shops that specialize in fishing gear, and many supermarkets and roadside businesses away from the urban area have small fishing tackle sections. Seven companies advertise fishing charters, and there are other, smaller charter operators in the area. Peripherally, economic benefits are produced by sales of products ranging from transportation equipment used partially or totally for fishing (boats, motors, ATVs, snowmachines, aircraft, and the associated service, repair and accessory industries) through such

items as ice augers and ice chisels sold at hardware stores. Fuel and supplies used for fishing trips are also purchased locally.

An estimated 25,695 anglers fished in the LTMA in 2002, and the 5-year average (1997 - 2001) is about 21,000 anglers (Table 9). On a statewide basis in 1999 about 39% of the anglers were residents (Howe et al. 2001). The proportion is likely higher in the LTMA. Cursory examination of creel census reports written in the late 1980s and early 1990s indicate that over 90% of the anglers in some popular fisheries were residents. Resident fishing licenses cost \$15, and the cheapest non-resident license is \$10. At a 39% residency rate and a \$10 minimum for non-residents, the 25,695 anglers fishing in the LTMA in 2002 generated a minimum of \$307,000 in license fees, less whatever proportion had the free license for residents over 60 years of age and in addition to whatever proportion purchased the \$10 King Salmon Stamp.

Inferences concerning the economic value of LTMA fisheries can be derived from an FDS report entitled Region III angler survey: use and valuation estimates for 1996, with a focus on Arctic grayling fisheries in Region III, produced by, Duffield, Neher and Merritt (2001). Willingness to pay per trip (WTP) estimates were developed for selected fisheries and components of fisheries within Region III. While all expanded results ([WTP] x [number of trips to that fishery in 1995 and 1996]) are provisional, the reported expanded results are likely representative of the true values (P. Merritt, Fishery Biologist, retired, ADF&G, Fairbanks; personal communication). WTP by residents for all species combined for the segment of Region III dominated by Tanana Valley anglers was about \$122. Number of trips (provisional) within the LTMA in 1996 was about 117,000. Expanded potential net economic value was about \$14,274,000.

Table 9.-Estimated annual number of anglers who fished in the LTMA, 1989-2002.

Year	Angler
1989	26,337
1990	25,861
1991	23,577
1992	21,478
1993	22,673
1994	21,987
1995	28,325
1996	24,046
1997	23,371
1998	19,423
1999	21,196
2000	17,136
2001	24,179
2002	25,695
10-Yr Average: 1992-2001	22,435
5-Yr Average: 1997-2001	21,169
2002 as % of 5-Year Avg.	123%

SECTION III: CHENA RIVER CHINOOK SALMON FISHERY

BACKGROUND AND HISTORICAL PERSPECTIVE

The Chena River is a rapid-runoff tributary to the Tanana River originating in the Tanana Uplands 90 miles east of Fairbanks. The river flows approximately 160 river miles from the uppermost reach in the East (Middle) Fork to the confluence with the Tanana River at Fairbanks. The watershed is about 2,000 mi², and includes five major tributaries: North Fork, West Fork, South Fork, East (Middle) Fork, and the Little Chena River. Collectively, these major tributaries and the mainstem are over 290 miles in length. Water color is transparent green at low river stages, but becomes stained with tannins during mild runoff events and darker with silt and organic material during rising stages.

The Chena River is road-accessible along a long section of the upper river paralleled by the Chena Hot Springs Road (CHSR) beginning at mile 25 CHSR (river mile 71). Urban development is extensive along the lower 25 river miles and road access is plentiful along the lower reaches flowing through the Badger Road area, Ft. Wainwright, and the City of Fairbanks. A section between the Badger Road area and river mile 71 has limited road access. Powerboats can navigate throughout the mainstem downriver from the confluence of the North Fork Chena River and the East (middle) Fork, and can travel a short distance up the East Fork Chena and South Fork Chena rivers. Reaches of the Chena River upriver of areas accessible by powerboat or by roads and trails are utilized by floaters in canoes and inflatable boats. All areas downstream of the farthest upstream road accessible spot are also very popular with the floaters.

There is a flood control project (the Chena River Lakes Flood Control Project) at river mile 45 consisting of a dam, long dikes, and a floodway upstream from the dam constructed south to the Tanana River near Moose Creek. The dam allows the water to pass freely at normal river stages through three floodgates. Fish passage is unimpeded until the river rises, creating is flood danger to property downstream. When flow exceeds 8,000 cfs, the floodgates are partially closed to maintain that flow rate downstream from the dam. Water is diverted along the floodway to the Tanana River. The floodgates have seldom been lowered while adult Chinook salmon were passing through the structure, and then only for short periods of time. A fishway built into the side of the structure is designed to allow fish passage if a large volume of water is backed up behind the dam. Because the water rarely gets high enough to flow down the fishway, its potential to pass migrating salmon is essentially untested.

The Chena River supports populations of: Arctic grayling *Thymallus arcticus*, Chinook salmon *Oncorhynchus tshawytscha*, chum salmon *O. keta*, round whitefish *Prosopium cylindraceum*, humpback whitefish *Coregonus pidschian*, least cisco *C. sardinella*, northern pike *Esox lucius*, burbot *Lota lota*, longnose suckers *Catostomus catostomus*, slimy sculpins *Cottus cognatus*, lake chubs *Couesius plumbeus*, Arctic lamprey *Lampetra japonica*, and a few sheefish *Stenodus leucichthys*. Grayling, salmon, whitefish, pike, burbot, and sheefish are taken in the sport fishery.

Adult Chinook salmon enter the Yukon River during or shortly after breakup, and migrate into the Tanana River to appear in the lower Chena River (920 miles from the Bering Sea) between late June and the second week of July. They move up the Chena River to spawning areas which are primarily upriver from the dam. The run ends in late July or early August.

There has been a Chinook salmon sport fishery at the Chena River since before statehood. It remained relatively small throughout the 1980s. Estimated harvests between 1977 and 1992 ranged from 0 to 375 fish, then increased dramatically in the mid - 1990s (Table 10). The 5-year average catch (1996-2000) was 1,547 and average harvest was 475. While run strength and river conditions can override effort in determining catch and harvest, the harvest potential of this fishery is likely increasing due to a combination of increased public awareness of its availability and improvements in the gear and fishing techniques used to target Chinook salmon. Chinook fisheries in the LTMA occur almost entirely during the month of July. The fishery on the Chena River is closed upstream from the Chena River Flood Control Project (the dam) at river mile 45. Most of the spawning occurs in this area.

The Chinook salmon fishery on the Chena River is road-accessible in numerous places through the communities of Fairbanks, Ft. Wainwright, and North Pole, and at the dam. There are several public and many private boat launches along the road-accessible areas of the river, including one at the dam. Anglers targeting Chinook salmon from boats tend to focus on the confluence of the Chena and Tanana rivers and some pools in the lower river through Fairbanks, and at the confluence of the Chena and Little Chena rivers. Those fishing from shore are scattered along the road accessible areas, with concentrations at Ft. Wainwright and at public use areas at the Nordale Road Bridge and the dam.

Chinook salmon escapement to the Chena River was estimated by aerial survey by Commercial Fisheries Division from 1974 through 1998, and by either mark-recapture experiments or counting tower operations or both by Sport Fish Division since 1986 (Table 10). The Chena River Dam is used as a "counting tower" by ADF&G personnel.

Regulations for Chinook salmon in the Tanana River drainage have remained unchanged since the early 1960s, at one per day, one in possession. The salmon fishery in the Chena River was closed or restricted to catch-and-release by EO in 1987, 1992, 1998, 2000, and 2001. Because of large returns, the bag limit was increased to two fish by EO in 1993 and 1994 and to three fish in 2003.

Estimated Chinook salmon escapement abundance (as opposed to aerial survey counts) between 1986 and 2002 ranged from less than 2,700 to over 13,000 for the Chena River (Table 10). The 5-year average (1996 - 2001) was about 8,500 fish.

Estimates of escapement abundance and length, age, and sex composition of Chinook salmon were conducted on the Chena River during July and August of 1998. Poor run strength indicators for Chinook for the entire Yukon drainage and low estimated escapement for the Chena River through July 14th precipitated an EO restricting fishing for Chinook salmon to catch-and-release only on that date. Estimated catch for 1998 was 779 and harvest was 299 fish.

The final escapement estimate for the 1998 Chena River Chinook return was below the escapement goal set for that fishery. The estimated escapement was 4,745 (SE = 503), about 25% below the escapement goal of 6,300 fish (Stubby and Evenson 1999a) and 45% below the 5-year average. The EO restricting the fishery to catch-and-release in 1998 cut off harvest at 299 fish. Had those fish not been harvested, the escapement would have still been about 1,250 fish below the 6,300 fish escapement objective.

Table 10.-Catch, harvest, and abundance of Chinook salmon from the Chena, Salcha, and Chatanika rivers, 1977 to 2002.

Year	Chena River			Salcha River			Chatanika River		
	Catch	Harvest	Abundance	Catch	Harvest	Abundance	Catch	Harvest	Abundance
1977	NA ^a	29	NA	NA	62	NA	NA	9	NA
1978	NA	23	NA	NA	105	NA	NA	35	NA
1979	NA	10	NA	NA	476	NA	NA	29	NA
1980	NA	0	NA	NA	904	NA	NA	37	NA
1981	NA	39	NA	NA	719	NA	NA	5	NA
1982	NA	31	NA	NA	817	NA	NA	136	NA
1983	NA	31	NA	NA	808	NA	NA	147	NA
1984	NA	0	NA	NA	260	NA	NA	78	NA
1985	NA	37	NA	NA	871	NA	NA	373	NA
1986	NA	212	9,065	NA	525	NA	NA	0	NA
1987	NA	195	6,404	NA	244	4,771	NA	21	NA
1988	NA	73	3,346	NA	236	4,562	NA	345	NA
1989	NA	375	2,666	NA	231	3,294	NA	231	NA
1990	406	64	5,603	680	291	10,728	164	37	NA
1991	258	110	3,025	515	373	5,608	181	82	NA
1992	71	39	12,241	86	47	7,862	31	16	NA
1993	2,545	733	11,877	1,788	601	10,007	625	192	NA
1994	1,308	993	9,680	971	714	18,399	278	105	NA
1995	1,095	662	7,153	4,091	1,448	13,643	134	58	NA
1996	3,663	1,270	10,811	3,298	1,136	7570	1,331	348	NA
1997	3,151	1,029	13,390	2,639	719	18,514	336	155	NA
1998	779	299	4,745	549	121	5,027	30	6	864
1999	2,004	442	6,845	1,237	445	9,198	63	63	966
2000	222 ^{d,e}	71 ^d	4,294	197 ^d	72 ^d	4,595 ^c	0 ^d	0 ^d	398
2001	1,579	536	9,696	707	108	13,328 ^d	32	23	919
2002	1,920	178	6,967	1,157	269	9,213	86	0	888 ^c

-continued-

Table 10.-Page 2 of 2.

Year	Chena River			Salcha River			Chatanika River		
	Catch	Harvest	Abundance	Catch	Harvest	Abundance	Catch	Harvest	Abundance
Averages^b									
1990-2002	1,462	494	8,192	1,378	488	10,172	253	83	NA
10-Yr Average: 1992-2001	1,642	607	9,090	1,556	541	10,669	286	97	NA
5-Yr Average: 1997-2001	1,547	475	7,828	1,066	293	9,841	92	49	NA
2002 as % of 5-Year Avg.	124.1%	37.4%	89.0%	108.6%	91.8%	93.6%	93.3%	0.0%	NA

^a NA = not available, NC = no count.

^b Averages are only of those years for which data is available.

^c Minimum abundance based on tower count with significant component of run uncounted due to high water.

^d Fishing for Chinook salmon was closed by Emergency Order due to weak run.

^e This estimate does not correspond to the published SWHS estimate because two components of the SWHS estimate for the Chena likely erroneously inflated the catch value by about 1,500 fish.

In 1999 indications of a weak Yukon River Chinook salmon return created concerns among staff biologists and users, and the escapement counts into the Chena River were scrutinized intensively throughout the run. The possibility of restrictions on the sport fishery loomed, but the final escapement estimate for the 1999 Chena River Chinook return was above the escapement goal (6,300) set for the Chena Chinook stock at that time (Table 10). The estimated escapement for 1999 was 6,845, about 75% of the 5-year average of 9,156. Estimated catch in the sport fishery was 2,004, and harvest was 442.

By the time that Chinook salmon entered the Tanana River in 2000, it was apparent that the Yukon River Chinook salmon (and summer chum salmon) run was extremely poor, as were those in the Kuskokwim, and chum salmon returns were similarly dismal. Sonar counts and test fisheries in the Yukon confirmed this, and escapement objectives into spawning streams downriver from the Tanana River were not being met. Alaska's Governor was characterizing the western Alaska salmon runs as a disaster, and governmental agencies were preparing to assist individuals and communities along the rivers dependant on salmon for human and dog food and cash income. Commercial fisheries downriver were closed, and subsistence fisheries were being severely restricted. In anticipation of the need to ensure maximum potential spawning escapement, personal use fishing in the Tanana River downstream from the Chena River was closed, and sport fishing for all salmon in the Tanana River drainage was closed by EO on July 17, 2000, which closed Chinook (and chum) salmon fishing in the Chena River. Subsistence fishing for salmon was severely restricted.

The salmon counting tower project was interrupted by a high water event from July 11 to July 16. Salmon were passing and the run was building and may have peaked while counts were interrupted. An estimated total of 1,903 Chinook salmon passed the dam before the run ended on August 1. The six-day interruption in counts was too large to allow an interpolated estimate of passage during the hiatus, so the tower counts were a very minimal estimate. A mark-recapture abundance estimate was accomplished after the majority of the Chinook salmon had passed the dam. Estimated abundance was 4,694 (Stuby 2001) which is about 71% of the escapement goal of 6,300 fish.

The same high water event that interrupted the tower counts made the river unfishable for sport fishing for salmon during what would have been the early stage of the sport fishery. As the river stage dropped and the turbidity cleared, allowing angling to resume, the fishery was closed by the EO. Catch was about 220 Chinook salmon, and harvest about 70.

FISHERY MANAGEMENT OBJECTIVES

Prior to 2001 the Chena River Chinook salmon sport fishery was managed under a management plan with an escapement goal and a guideline harvest allocation for the sport fishery. An escapement goal based on aerial surveys was set by Commercial Fisheries Division in 1992 at 1,700 fish for the Chena River. Sport Fish Division in 1993 expanded this aerial survey escapement goal into an actual escapement abundance goal of 6,300 fish. The guideline sport harvest objective set by the BOF was 300 - 600 Chinook salmon. In-season management for the guideline harvest objectives is next to impossible because there is no mechanism for day-to-day enumeration of the harvest. A creel survey providing that information would difficult and expensive to implement.

Recently the department has reviewed the policy on salmon escapement goals. A biological escapement goal (BEG) committee was formed to evaluate and calculate BEGs for Chena and

Salcha rivers Chinook salmon and for some Yukon drainage chum salmon stocks. The BEG process is designed to set escapement ranges which maximize potential yield. ADF&G has established Biological Escapement Goal ranges (BEG) for Chinook salmon in the Chena and Salcha rivers, which are based on analysis of run reconstruction data related to brood year returns. These BEGs are calculated using all available escapement and brood year return data for the stocks in question. In November 2000, the committee set BEG ranges of 2,800–5,700 Chinook salmon for the Chena River and 3,300–6,500 for the Salcha River. The BEG ranges are lower than the 6,300 and 7,100 Chinook salmon "point" escapement objectives for those rivers, and reflect the results of analysis of return and brood year data which indicates that down to a certain point smaller escapements can produce greater returns than larger escapements. The point objectives were calculated in the early 1990s based on averages of escapement data available at that time. It is interesting to note that all of the documented escapements for the Chena River have fallen within or in excess of the new BEG range, even during runs which were considered to be very poor in the Yukon River generally.

Sport Fish Division forwarded a proposal to the BOF to develop a strategy of managing the sport fishery for escapement numbers within the BEG range. That proposal created a system allowing for management of the sport fishery to ensure proper escapement. Because the Chinook salmon sport fishery in the Chena River is the last potential harvest of those fish before they arrive at their spawning area, there is a direct and controllable relationship between sport harvest and escapement to spawn, unconfounded by other fisheries (as happens downriver). The in-season strategy is to use escapement and passage data accumulated over the years to develop target cumulative passage numbers or rates for points early in the run (for example, "x" number of fish passing per day or cumulative passage by day six of the run). These thresholds are used to develop projected escapements gauging the likelihood of the total escapement falling within or out of the BEG range. EO actions to restrict or liberalize the sport fishing regulations are implemented as needed as directed by 5 AAC 75.003, 2003. The escapements in the Chena and Salcha rivers mirror each other sufficiently so that inferences regarding attainment of BEGs for both rivers can be made even if good data is available from only one of the rivers. If high water disrupts the counts in one of the rivers, but not the other, the escapement projections and estimates for the river in which an accurate estimate can still be made are considered an index of the Chinook escapement in the other river, and are used as a measure of run strength versus the BEG.

In January, 2001 the BOF adopted policy directing ADF&G to manage harvest so that escapements fall within the BEG ranges set by ADF&G. The BEGs will be evaluated and modified as needed on a 3-year cycle in synchrony with the 3 year BOF meeting cycle during which they address fisheries issues within the Yukon drainage. Chinook salmon BEG range for the Chena River is 2,800 - 5,700 fish, and for the Salcha River is 3,300-6,500. The guideline harvest ranges for the sport fishery were repealed.

RECENT FISHERY PERFORMANCE (2001 AND 2002 SUMMARY AND PRELIMINARY INFORMATION FOR 2003)

2001 Escapement and Fishery

As in 2000 the projected Yukon River Chinook salmon (and summer chum salmon) run was extremely poor. Sonar counts and test fisheries in the Lower Yukon seemed to confirm this, and escapement objectives into spawning streams downriver from the Tanana River drainage were

not being met. Commercial fisheries downriver were closed, and subsistence fisheries were restricted. Personal use fishing in the Tanana River downstream from the Chena River was closed. Sport fishing for Chinook salmon in the Tanana River drainage was restricted to catch-and-release by EO on July 7, 2001, which restricted Chinook salmon fishing in the Chena River. Subsistence fishing for salmon was restricted (by reduced time for fishing) in the Tanana River from the Nenana area downstream. The first Chinook salmon passed the Chena River Dam on July 5. During July 7-9 the Chena River was high and turbid, and salmon could not be counted. Counts resumed on July 10, and increasing numbers of fish began passing on July 12. After starting rather late, the Tanana River drainage Chinook salmon run began showing unexpected strength almost immediately. Strong passage rates past the counting towers were coupled with reports of continued good catches in test fisheries and subsistence fisheries in the Tanana River from its confluence with the Yukon River to Nenana. Indicators used to monitor run strength downstream included: (a) Commercial Fish Division Yukon River test fisheries and the Pilot Station Sonar, (b) Test fisheries in the Tanana River, (c) monitoring of subsistence fisheries through department efforts, and (d) the weekly teleconference during which residents along the Yukon and Tanana rivers from the Bering Sea to Nenana provided observations, catch reports, and comments about the management of the salmon fisheries. Reports from the villages of Tanana and Manley and from the Yukon Rapids upstream from the mouth of Tanana River in Rampart Canyon were particularly interesting when continued strong passage was indicated after the anticipated peak.

By July 17 projected escapements in the Chena (and Salcha) rivers in excess of the BEG ranges, and the opportunity to harvest Chinook salmon was restored. Harvest was allowed in the sport fishery beginning on July 20. Estimated catch was about 1,600 fish and harvest was 536 fish.

Counts continued with one short interruption during a high water event until July 30, when counts were terminated as the run tailed off and the river came up and became turbid. Total estimated escapement for the Chena River was 9,696, based on counts and interpolations for periods of turbidity. Total escapement was probably over 10,000.

2002 Escapement and Fishery

Anticipated poor Chinook salmon returns in the Yukon drainage precipitated a pre-season drainage-wide EO restricting the Chinook salmon bag and possession limit to one fish. This had no impact on LTMA fisheries, since that is the existing regulation in the LTMA.

The first Chinook salmon were seen at the Chena counting station on June 29. On July 4, a high water event began which stopped both enumeration and the sport fishery until July 17. Counting resumed for 4 days beginning on July 17, before again being suspended due to high water. Counts and down-river indicators indicated a robust escapement. No regulatory actions were needed for the sport fishery. A mark-recapture abundance estimate was undertaken in the spawning areas upriver from the dam. Estimated abundance of Chinook salmon in the Chena River in 2002 was about 7,000 fish (BEG range 2,800 – 5,700). Estimated catch was about 2,000 and harvest was 178 (Table 10.)

2003 Escapement and Fishery (preliminary)

The Yukon River Chinook escapements were unexpectedly strong in 2003. The Chena River Chinook salmon enumeration project was again wiped out by a pair of flood crests (beginning on July 15, as the run was peaking) in 2003. No mark-recapture abundance estimate was

undertaken. Documented escapement (estimated escapements from days when salmon could be counted) was 8,739. Passage pattern was indicative of a projected escapement of about 11,000 Chinook salmon. The bag limit was increased by EO to 3 daily and in possession on July 11, when it became apparent that the BEG range of 2,800 – 5,700 would be exceeded by a substantial margin.

FISHERY MANAGEMENT ACTIVITIES/RESULTS

In concert with the adoption of biological escapement goals and the continuing tower counts, a suite of in-season predictive models were developed to interpret the meaning of tower counts.

During the 1990s researchers accumulated five complete sets of tower count Chinook enumeration data for the Chena River and six in the Salcha. These were years in which there was enough continuous counting to produce a valid abundance estimate, which provided cumulative entry patterns. These patterns were aligned by day-of-run (which eliminated the skewing introduced by using calendar date) and, with the assistance of a biometrician, a pair projection models were developed.

One was a set of expected day-of-run cumulative escapement curves for the upper and lower boundaries of the beg ranges for each river. The actual in-season cumulative escapement curve is updated on a daily basis, comparing it to the model and ascertaining the likelihood of attaining the BEG. If the in-season cumulative escapement is tracking within the range of the model curves, no regulatory action is needed. If the in-season curve is falling below the required escapement to fall within the BEG range, restrictions on downriver sport, commercial, personal use, and subsistence fisheries might be employed. If the escapement is exceeding the BEG range and increasing the harvest level will not keep it below the upper limit, harvest opportunity in those fisheries may be liberalized.

The other model developed was projected escapement. Average proportion of the run that had typically passed by a given day-of run-is multiplied by estimated cumulative passage on that day of the run in-season, providing an estimate of projected total escapement.

These models will be strengthened over time by addition of more passage information.

Because a large group of people in CFMD, Sport Fish Division, and others base in-season management activities on current escapement information from the Chena River and Salcha River counting projects (Salcha project run by a contractor for Bering Sea Fisherman's Association; reports to ADF&G three times a day), an ADF&G internal run status update report that was developed and is produced and distributed frequently during the middle of the run.

Components include:

A. Current situation and conditions

1. Current regulations or EOs.
2. Project/infrastructure status.
3. Current water conditions and visibility.
4. Any weather water conditions that might impact counts in the near future.

B. Current escapement status

1. Cumulative escapement as of the previous midnight.

2. Comments on peaks and pulses of Chinook salmon past the counting stations.
3. What proportion of the run is usually past by the date of the status report.

C. Projected escapements

1. The BEG for each river is described.
2. Projected escapement for each river as of the previous midnight.
3. Any shift counts or hourly counts since midnight that might be indicative of the situation.

D. Conclusion

1. Whether projected escapements will fall within beg ranges and where in relation to the midpoints of the beg ranges the projected escapements will fall; or,
2. Whether projected escapements will fall above or below the beg ranges.

E. Recommendations:

1. Recommended management actions if any are needed.

This structured approach to tower count data seems to facilitate in-season management.

BOF ACTIONS

During the 2001 BOF meeting the Chena and Salcha Rivers king salmon sport harvest management plan was adopted directing that the Chena and Salcha sport fisheries be managed to attain biological escapement goals. No proposals for BOF action on the Chena River Chinook salmon fishery are pending for the January, 2003 BOF meeting.

FISHERY OUTLOOK

Recent Chinook salmon returns to the Chena River have been more robust than the general returns to the Yukon River drainages, but the overall Yukon River escapements have been showing increasing strength. Whether the stock continues to rebound from lower levels is dependant on returns from less than optimum abundances of parent stocks. The situation is generating considerable anxiety, speculation, and discussion among user groups and management organizations.

ONGOING AND RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Chinook salmon escapements (abundance) have been estimated annually by counting salmon using the Chena River dam as a counting station and by mark-recapture estimates, or both, since 1986 (Table 10). In addition to estimating escapements with tower counts, carcass sampling has been done annually to estimate size and age distributions and sex ratios. From 1986 to 2002, whenever the tower counts were invalidated by high water events producing periods of turbid water for more than about 3 days, an abundance estimate was obtained through a mark-recapture effort. Electrofishing was used to capture the Chinook salmon for marking. Recently, more rigorous criteria have been set (by Region III staff) which must be met before electrofishing is used to obtain an abundance estimate. Consequently, there may not be a complete abundance estimate each year. However, partial documented abundance from tower counts is often sufficient to determine whether escapements are within or greater than the BEG range, and to project a likely estimate of total escapement.

Catch and harvest continue to be estimated by RTS, and management proceeds as described above.

SECTION IV: SALCHA RIVER CHINOOK SALMON FISHERY

BACKGROUND AND HISTORICAL PERSPECTIVE

The Salcha River flows from headwaters in the Tanana hills about 120 miles northeast of its mouth to enter the Tanana River near Harding Lake. It is a rapid-runoff stream, and the water is transparent or slightly stained with tannin except during periods of heavy runoff. The Richardson Highway Bridge crosses the Salcha about three river miles upstream from its confluence with the Tanana, and there is a campground and boat launch at the bridge. There are many cabins along the lower 70 miles of river. Access to the river is limited to boat and aircraft upstream from the bridge, and snowmachine in the winter.

The Salcha River supports populations of: Arctic grayling *Thymallus arcticus*, Chinook salmon *Oncorhynchus tshawytscha*, chum salmon *O. keta*, round whitefish *Prosopium cylindraceum*, humpback whitefish *Coregonus pidschian*, northern pike *Esox lucius*, burbot *Lota lota*, longnose suckers *Catostomus catostomus*, slimy sculpins *Cottus cognatus*, and Arctic lamprey *Lampetra japonica*. Grayling, the salmon, the whitefish, pike, and burbot are taken in the sport fishery.

Adult Chinook salmon enter the Yukon River during or shortly after breakup, and migrate into the Tanana River to appear at the mouth of the Salcha River (965 miles from the Bering Sea) between late June and the second week of July. They move up the Salcha River to spawning areas. The run ends in late July or early August.

There has been a Chinook salmon sport fishery at the Salcha River since before statehood. The salmon fishery is accessible from the Richardson Highway at the bridge and nearby campground and down a trail near the Munson Slough parking area. Boaters launch at the campground and travel downstream to fish at the confluence of the Tanana and Salcha rivers.

The salmon fishery on the Salcha River is closed above a marker located about 2 1/2 miles upriver from the Richardson Highway Bridge (about 5 miles upstream from the confluence of the Salcha and Tanana rivers). Most of the spawning occurs upstream of this area.

Harvests exceeded those of the Chena River until 1989, and the Salcha River fishery had the higher profile of the Tanana River drainage Chinook salmon fisheries. Estimated harvests between 1977 and 1992 ranged from 47 to 904 (Table 10). Catch and harvest did not increase as dramatically in the Salcha as in the Chena, but harvests exceeded 1,000 fish in 1995 and 1996. The 5-year average catch (1997-2001) was 1,066 and average harvest was 293 fish. The harvest potential of this fishery could be increasing due to improvements in the gear and fishing techniques used to target Chinook salmon.

Chinook salmon escapement to the Salcha River has been estimated by aerial survey by Commercial Fisheries Division annually beginning in 1974, by Sport Fish Division during 1987 - 1998 using either mark-recapture experiments or counting tower operations or both. The salmon counting operation on the Salcha River was funded by the Yukon River drainage Fisheries Association (YRDFA) and undertaken by a contractor beginning in 1999. YRDFA closely follows the project design and methodology established by Sport Fish Division for this project, and Sport Fish Division provided some logistical support during start-up in 1999 and 2000. Contractor staff report Chinook salmon passage counts to both Sport Fish Division and

Commercial Fish Division at the end of each shift so that ADF&G can calculate and track cumulative passage.

Estimated Chinook salmon escapement abundance (as opposed to aerial survey counts) between 1987 and 2001 ranged from about 3,300 to over 18,400 for the Salcha River (Table 10). The 5-year average (1997 - 2001) is about 9,800 fish. The fishery in the Salcha was closed by EO in 1987, 1992, and in 1998. Because of large returns, the bag limit was increased to two fish by EO in 1993 and 1994.

FISHERY MANAGEMENT OBJECTIVES

The management process for the Salcha River Chinook salmon stock has paralleled that of the Chena River, with managers and the BOF dealing with both rivers together. BEG for the Salcha River Chinook salmon stock is 3,300 -6,500 fish.

RECENT FISHERY PERFORMANCE (2001 AND 2002 SUMMARY AND PRELIMINARY INFORMATION FOR 2003)

2001 Escapement and Fishery

The Salcha River Chinook salmon fishery chronology paralleled that of the Chena River in 2001, with a restriction to catch-and-release during the early part of the run and a return to legal harvest on July 20. The first Chinook salmon passed the Salcha River Tower on July 5. During July 7-9 the Salcha River was high and turbid, and salmon could not be counted. Counts resumed on July 10, and were suspended again due to high water on July 24 as the run was peaking. By the time they were fully resumed the run was essentially over. The discussions found in the section (above) describing the 2001 Chena River/Yukon-Tanana Chinook salmon stock also applies to the Salcha River escapement.

Documented escapement for the Salcha River was about 9,100 Chinook salmon. Total estimated escapement for the Salcha River was about 13,000, based on counts and interpolations for periods of turbidity. Estimated sport catch was about 707 fish and harvest was 108 fish.

2002 Escapement and Fishery

Anticipated poor Chinook salmon returns in the Yukon drainage precipitated a pre-season drainage-wide EO restricting the Chinook salmon bag and possession limit to one fish. This had no impact on LTMA fisheries, since that is the existing regulation in the LTMA.

The first Chinook salmon were seen at the Salcha tower station on June 29. On July 4, the same high water event that stopped the Chena River Chinook counts caused suspension of the Salcha River counts until July 15. Counts continued intermittently thereafter between periods of turbidity. Documented escapement was about 4,600 and estimated abundance based on historical passage patterns was about 9,200.

Estimated sport catch was about 1,150 and harvest was about 270 (Table 10.).

2003 Escapement and Fishery (Preliminary)

The Yukon River Chinook escapements were unexpectedly strong in 2003. Like the Chena River Chinook salmon enumeration project, the Salcha project was wiped out by a pair of flood crests (beginning on July 15, as the run was peaking) in 2003. No mark-recapture abundance estimate was undertaken. Documented escapement (estimated escapements from days when salmon could be counted) was 11,758. Passage pattern was indicative of a projected escapement

of about 16,000 Chinook salmon. The bag limit was increased by EO to 3 daily and in possession on July 11, when it became apparent that the BEG range of 3,300 – 6,500 would be exceeded by a substantial margin.

FISHERY MANAGEMENT ACTIVITIES/RESULTS

The escapement goal evaluation process as discussed in Section III (Chena River Chinook salmon fishery), included the Salcha River, and the department has adopted a BEG range of 3,300 - 6,500 Chinook salmon for the Salcha River Chinook stock. The BEG range is lower than the 7,100 Chinook salmon "point" escapement objective for the Salcha River, and reflects the results of analysis of return and brood year data which indicates that down to a certain point smaller escapements can produce greater returns than larger escapements. All of the documented escapements for the Salcha River have fallen within or in excess of the new BEG range, even during runs which were considered to be very poor in the Yukon River generally (Table 10).

BOF ACTIONS

During the 2001 BOF meeting the Chena and Salcha River King Salmon Sport Harvest Management Plan was adopted directing that the Chena and Salcha sport fisheries be managed to attain biological escapement goals. No proposals for BOF action on the Salcha River Chinook salmon fishery are pending for the January, 2003 BOF meeting.

FISHERY OUTLOOK

Recent Chinook salmon returns to the Salcha River have been more robust than the general returns to the Yukon River drainages, but the overall Yukon River escapements have been showing increasing strength. Whether the stock continues to rebound from lower levels is dependant on returns from less than optimum abundances of parent stocks. The situation is generating considerable anxiety, speculation, and discussion among user groups and management organizations.

ONGOING AND RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Chinook salmon escapements (abundance) have been estimated annually by counting salmon from the Richardson Highway Bridge or, more recently, a counting tower near the bridge, and by mark-recapture estimates, or both, since 1987 (Table 10). In addition to estimating escapements with tower counts, carcass sampling has been done annually to estimate size and age distributions and sex ratios. Catch and harvest continue to be estimated by RTS, and management proceeds as described above.

SECTION V: OTHER ANADROMOUS SALMON SPORT FISHERIES AND COMMERCIAL, PERSONAL USE, AND SUBSISTENCE HARVESTS OF TANANA RIVER STOCKS

BACKGROUND AND HISTORICAL PERSPECTIVE

Sport Fisheries

A sport fishery for Chinook salmon occurs on the Chatanika River downstream from a marker located one mile upstream from the Elliot Highway Bridge. Salmon fishing is closed upstream from that marker to protect spawning fish. The run is small and attracts little effort. A counting tower project a few miles downstream from the Elliott Highway Bridge began producing escapement estimates in 1998 (Table 10). Timing is similar to that of the Salcha and Chena rivers Chinook salmon runs, with the run and fishery occurring in July. The 5-year (1997 - 2001) average catch is 286 and harvest is 97 fish (Table 10). When an EO is implemented restrictively changing the fishing regulations for Chinook salmon based on information from the Chena and Salcha rivers or downriver (Yukon and Tanana River) run indicators, it covers all of the Chinook fisheries in the Tanana drainage, including the Chatanika River. However, Emergency Regulations relaxing in-season restrictions or liberalizing standard regulations may not apply to the Chatanika River and other Tanana drainage stocks, if the information is based only on tower count information from the Chena and Salcha rivers and there is not solid information as to run status in the other streams.

Minor sport fisheries for summer chum salmon and coho salmon occur in the LTMA (Tables 4a, 4b, 4c, 5, 6, 7 and 8). Chum salmon are primarily available in July and August during and just after the Chinook salmon fisheries (summer chums), and are targeted as a secondary species. There is a run of fall chums that appears in the Tanana drainage in September, but they are not generally targeted by anglers. While summer chums are generally more abundant than Chinook salmon, are subject to a more liberal daily bag and possession limit (3 fish, or 2 fish if an angler already has a Chinook), and are readily taken on certain types of spinning gear; average total harvest (Table 5) and retention rate (Table 8) is lower than that for Chinook. The poor quality of summer chum salmon flesh for human consumption is likely a contributing factor. The 5-year (1997 - 2001) average chum salmon harvest in the LTMA was 205 fish. This harvest rate is likely driven down by a series of EOs closing chum salmon fishing (Table 1).

Coho salmon become available in the Tanana River drainage fisheries during September. They spawn in groundwater-fed stream systems (commonly known as "clearwaters"). There is a major coho salmon fishery in the Upper Tanana River Management Area (UTMA) within the Delta Clearwater River. Annual area management reports for the UTMA describe run status and escapement to the Delta Clearwater. In the LTMA coho salmon are harvested in tributaries of the Nenana River system near the community of Anderson, and in a few "other streams". These are small-scale fisheries (Table 11). The 5-year (1997 - 2001) average coho salmon harvest in the LTMA was 166 fish. Coho harvest in 2002 was 24 fish.

Table 11.-Sport harvest and catch for LTMA coho stocks, 1983 - 2002.

Year	Nenana River Drainage		Other Streams		Total	
	Catch	Harvest	Catch	Harvest	Catch	Harvest
1983	N/A ^a	N/A	N/A	0	N/A	84
1984	N/A	N/A	N/A	33	N/A	158
1985	N/A	N/A	N/A	25	N/A	25
1986	N/A	N/A	N/A	460	N/A	281
1987	N/A	0	N/A	0	N/A	0
1988	N/A	255	N/A	206	N/A	461
1989	N/A	192	N/A	288	N/A	493
1990	664	261	24	8	688	269
1991	1,679	222	221	221	1,900	443
1992	583	89	177	109	760	198
1993	0	0	291	29	272	29
1994	720	440	226	99	946	539
1995	114	77	1,016	516	1,130	593
1996	775	149	1186	199	1961	348
1997	767	179	497	163	1,264	342
1998	422	119	128	6	550	125
1999	142	33	189	108	331	141
2000	124	6	323	34	447	40
2001	739	118	153	62	892	180
2002	98	24	128	-	226	24
10-Yr Average: 1992-2001	439	121	419	133	857	254
5-Yr Average: 1997-2001	439	91	258	75	697	166
2002 as % of 5-Year Average	22%	26%	50%	0%	32%	14%

^a NA = data not available.

FISHERY MANAGEMENT OBJECTIVES

Management objectives for the Chatanika River and other small Chinook salmon fisheries and LTMA coho and chum salmon fisheries are to maintain currently available fishing opportunities whenever the run strength indicators such as the Commercial Fish Division test fisheries downstream from the sport fisheries and counting tower projects indicate adequate run strength to meet escapement needs.

RECENT FISHERY PERFORMANCE (2001 – 2002 SUMMARY AND AVAILABLE INFORMATION FOR 2003)

Estimated Chinook salmon escapements in the Chatanika River have been approaching 1,000 fish. Actual escapement is likely greater, since the Chatanika River counting tower project has been plagued by the same high water events impacting the Chena and Salcha rivers Chinook salmon escapement assessment projects. Catch and harvest have declined recently (Table 10). EOs and periods when the river was unfishable were a factor.

LTMA chum salmon sport catches and harvests declined in response to EOs prior to 2002, then recovered somewhat (Table 5).

Coho catch and harvest has been variable, reflecting the spotty, small scale nature of the fisheries compared to the major fishery in the Delta Clearwater River in the Upper Tanana Management Area.

FISHERY MANAGEMENT ACTIVITIES/RESULTS

The EOs listed in Table 1 changing Chinook and chum salmon fishing regulations impact angling opportunity targeting these stocks. In-season conservation restrictions on the smaller Chinook fisheries are driven by the overall Tanana drainage Chinook salmon in-season actions. They are based on the performance of Yukon Chinook stocks generally and on index information from the three spawning escapement projects in the Tanana drainage (Chena River, Salcha River, and Chatanika River counting projects). Relaxation of in-season restrictions (reverting to the background regulations) may occur on these small stocks if so indicated by run strength at the counting projects and positive down-river indicators. Liberalization of sport bag limits through EOs does not occur on these small stocks. It can only be implemented on the two stocks for which BEGs have been set (the Chena and Salcha rivers) and only when the BEG range is being exceeded by the escapement.

In-season management of chum salmon sport fisheries is driven by down-river indicators. In-season management of coho salmon sport fisheries is driven by down-river indicators and also by run strength in the Delta Clearwater River in the Upper Tanana River Management Area.

BOF ACTIONS

The BOF did not take any new actions regulating the LTMA chum salmon, coho salmon, or Chatanika River and other small Chinook salmon fisheries during the January 2001. There are no proposals pending before the BOF dealing with sport harvest of these stocks in the LTMA.

FISHERY OUTLOOK

Low levels of catch and harvest will continue whenever fishing is not closed by EO.

ONGOING AND RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Chum salmon are counted incidentally to Chinook salmon as they pass the counting tower projects at the Salcha, Chatanika, and Chena rivers. These counts can provide run strength information to be combined with information collected by others as the chums approach their final destinations.

COMMERCIAL, SUBSISTENCE, AND PERSONAL USE FISHERIES

The spawning stocks of Chinook salmon within the LTMA are the most abundant Yukon drainage Chinook spawning stocks between the Anvik River and the Canadian Border, and are very important to commercial, subsistence, and personal use fishermen in the middle Yukon and Tanana rivers.

Tanana River stocks of Chinook, chum, and coho salmon provide commercial fisheries in the Tanana River District. Commercial fishing is regulated by EO in three statistical areas (6a, 6b, 6c), from the mouth of the Tanana River to the mouth of the Chena River. Commercial fishing above the mouth of the Chena River is prohibited. Commercial harvests can target summer and fall chum and Chinook salmon, with some incidental catch of coho salmon. From 1995 to 1997, 4.6%, 6.9% and 11.1% of the total Alaskan Yukon River commercial summer chum salmon harvest was caught in Tanana drainage (Table 12). This proportion dropped drastically with the failure of summer chum runs during 1998 - 2002, and finally began a small recovery in 2002. From 0% to 3.4% of the Alaskan Yukon River Chinook commercial harvest has occurred during these 5 years in the Tanana River drainage, all in the LTMA. For all salmon species, commercial harvest in the Tanana drainage declined from 9.5% of the total Alaskan Yukon harvest in 1995, to zero in 2000 and 2001. The recent show of strength of Tanana drainage salmon stocks is reflected by a proportional harvest of 10.5% of the total Yukon River commercial harvest in 2002. The fall chum salmon harvest in the Tanana River drainage has constituted a higher proportion of the total Alaskan Yukon harvest than the summer chum harvest, since lower river fisheries close early enough to allow more escapements. In 1997, the Yukon River drainage fall chum salmon Management Plan was implemented directing that commercial fisheries only be allowed when run strengths are projected to be greater than 600,000 fall chum salmon. Based on in-season indicators, the Tanana River component of the fall chum salmon return was weaker than anticipated and was closed to commercial fishing during 1997 - 2002. As a consequence there was no commercial coho salmon fishery in the LTMA during these years.

Subsistence and personal use salmon fisheries occur in the Tanana River within the LTMA (Table 13). The Tanana River from its confluence with the Yukon upstream to the Wood River is open to subsistence salmon fishing with a permit requirement and periods and other restrictions set by the BOF and the potential for additional regulation by EO. Personal-use fishing for salmon is allowed in the Tanana between the Wood River and the Salcha River, and the fishery is regulated similar to the subsistence fishery.

The Division of Commercial Fisheries Management and Development (CFMD) is charged with management of the subsistence and personal-use fishing in the LTMA, and documentation of the harvest.

Table 12.-Commercial salmon harvest in the Tanana River drainage and percent of the Yukon River drainage Alaska harvest during 1995 - 2003.

Species	1995			1996			1997		
	Tanana Total	Yukon Total	% Tanana	Tanana Total	Yukon Total	% Tanana	Tanana Total	Yukon Total	% Tanana
Chinook	2,747	124,052	2.2%	447	90,192	0.5%	2,728	113,610	2.4%
Summer chum	37,428	818,414	4.6%	46,890	682,233	6.9%	25,287	228,252	11.1%
Fall chum	74,117	283,057	26.2%	17,574	105,630	16.6%	0	58,187	0
Coho	6,900	47,013	9.5%	7,142	55,982	12.8%	0	35,320	0
Total	121,192	1,272,536	9.5%	72,053	934,037	7.7%	28,015	435,369	6.4%

Species	1998			1999			2000			2001		
	Tanana Total	Yukon Total	% Tanana	Tanana Total	Yukon Total	% Tanana	Tanana Total	Yukon Total	% Tanana	Tanana Total	Yukon Total	% Tanana
Chinook	963	43,699	2.2%	690	69,563	0.99%	0	8,518	0	0	0	0
Summer chum	570	28,798	1.2%	148	29,413	0.50%	0	6,624	0	0	0	0
Fall chum	0	0	0	0	20,371	0.00%	0	0	0	0	0	0
Coho	0.0	1	0	0	1,601	0.00%	0	0	0	0	0	0
Total	1,533	72,498	2.1	838	120,948	0.69%	0	15,142	0	0	0	0

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Table 12.-Page 2 of 2.

Species	2002			2003			2004			2005		
	Tanana	Yukon	%	Tanana	Yukon	%	Tanana	Yukon	%	Tanana	Yukon	%
	Total	Total	Tanana	Total	Total	Tanana	Total	Total	Tanana	Total	Total	Tanana
Chinook	836	24,656	3.39%	1,813	41,117	4.41%	N/A	N/A	N/A	N/A	N/A	N/A
Summer chum	3,198	13,776	23.21%	0	0	0	N/A	N/A	N/A	N/A	N/A	N/A
Fall chum	0	0		8,556	13,776	62.11%	N/A	N/A	N/A	N/A	N/A	N/A
Coho	0	0		15,119	25,423	59.89%	N/A	N/A	N/A	N/A	N/A	N/A
Total	4,034	38,432	10.50%	25,488	80,136	31.81%	N/A	N/A	N/A	N/A	N/A	N/A

Table 13.-Subsistence and personal use salmon harvest in the Tanana River drainage and percent of Yukon River drainage Alaska harvest during 1995 - 2002.

Species	1995			1996			1997		
	Tanana	Yukon	%	Tanana	Yukon	%	Tanana	Yukon	%
	Total	Total	Tanana	Total	Total	Tanana	Total	Total	Tanana
Chinook	2,178	48,934	4.45%	1,392	43,521	3.20%	3,025	56,291	5.37%
Summer chum	12,441	119,503	10.41%	8,391	103,408	8.11%	4,215	97,500	4.32%
Fall chum	50,031	131,369	38.08%	36,832	129,222	28.50%	19,834	95,425	20.78%
Coho	19,219	28,642	67.10%	15,091	30,510	49.46%	11,945	24,295	49.17%
Total	83,869	328,448	25.53%	61,697	306,661	20.12%	39,019	273,511	14.27%

Species	1998			1999			2000			2001		
	Tanana	Yukon	%	Tanana	Yukon	%	Tanana	Yukon	%	Tanana	Yukon	%
	Total	Total	Tanana	Total	Total	Tanana	Total	Total	Tanana	Total	Total	Tanana
Chinook	2,276	54,090	4.21%	1,955	52,525	3.72%	1,058	35,916	2.95%	2,449	55,941	4.38%
Summer chum	6,088	86,088	7.07%	3,036	70,705	4.29%	1,141	64,925	1.76%	558	72,301	0.77%
Fall chum	14,372	62,869	22.86%	15,733	89,998	17.48%	311	19,307	1.61%	3,536	35,713	9.90%
Coho	7,481	17,781	42.07%	9,547	20,970	45.53%	5,150	14,717	34.99%	9,000	22,156	40.62%
Total	30,217	220,828	13.68%	30,271	234,198	12.92%	7,660	134,865	5.68%	15,543	186,111	8.35%

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Table 13.-Page 2 of 2.

Species	2002			2003			2004			2005		
	Tanana	Yukon	%	Tanana	Yukon	%	Tanana	Yukon	%	Tanana	Yukon	%
	Total	Total	Tanana	Total	Total	Tanana	Total	Total	Tanana	Total	Total	Tanana
Chinook	1,193	43,868	2.72%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Summer chum	687	87,231	0.79%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fall chum	3,205	19,677	16.29%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Coho	9,519	15,509	61.38%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	14,604	166,285	8.78%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

SECTION VI: CHENA RIVER ARCTIC GRAYLING FISHERY

BACKGROUND AND HISTORICAL PERSPECTIVE

The Chena River grayling fishery has been popular since before statehood, and has increased in stature as the Chena Valley has been developed and access has improved. The grayling fishery is almost entirely an open water fishery, occurring from April through October. The section on Chena River Chinook salmon describes the river and angler access. Anglers target grayling throughout the road and boat accessible sections of the river and its tributaries, and some are transported to the headwaters by aircraft to begin float trips during which they fish for grayling. Badger Slough is an important component of the Chena River grayling fishery, and an important spawning and rearing area for lower river grayling.

Because of its accessibility, the Chena River grayling stock offers angling opportunity to a broad socio-economic and age spectrum of anglers. These range from adults and youngsters of all income and levels of angling experience living within easy walking distance to the river to those able to afford guiding services or transportation enabling them to fish in the upper river away from the road system. There is road access to the river from Eielson Air Force Base and the river flows through Fort Wainwright army base, giving military personnel on post direct access to the river. The Chena River State Recreation Area is visited by residents and non-resident visitors to Alaska traveling along the road system. Many of them go fishing. The Chena River grayling stock is enjoyed by anglers motivated to pursue high-quality fishing and by those who simply wish to go fishing.

The SWHS divides the Chena into the "upper river" and "lower river" at river mile 71, and provides estimates of effort, catch, and harvest of all species for each section. Species distributions and the regulations restricting salmon fishing and the use of bait above the dam at river mile 45 (described in Section III) dictates that almost all of the effort in the SWHS-designated upper river is directed toward grayling. The lower river supports a multi-species fishery, including the Chinook salmon fishery which appears to be growing. So while the majority of the effort in the Chena River is probably directed toward grayling, effort has not yet been apportioned between species and the multi-species fishery confounds attempts to describe the total effort targeting grayling within the Chena River fisheries.

From 1977 through the mid-1980s, the Arctic grayling fishery on the Chena River was the largest grayling fishery in the state of Alaska. Annual fishing effort for the period 1979 - 1986 (for all species) averaged about 33,000 angler-days (Table 14). A series of restrictive regulation changes in response to conservation concerns from 1987 through 1992 likely reduced overall effort targeting grayling during that period, although poor weather in 1992 also impacted effort. The regulatory regime has been stable (open to grayling fishing but restricted to catch-and-release all year) since 1993. Estimates of total effort for the Chena River between 1994 and 1998 averaged about 33,400 days fished, which was 30% of all effort in the LTMA. The increase in effort reported in the upper Chena River during this period is almost entirely directed toward Arctic grayling. Effort declined slightly in 1998 to 27,910 days fished and estimated catch declined to 89,000.

Table 14.-Estimated angler effort (number of angler-days) and Arctic grayling harvest and catch from the Chena River, with comparison to LTMA, 1977-2002.

Year	Upper Chena Effort ^a	Lower Chena Effort ^a	Total Effort ^a	Effort as % of LTMA Effort	Grayling Harvest	Harvest as % of LTMA Grayling Harvest	Grayling Catch	Catch as % of LTMA Grayling Catch
1977	N/A ^g	NA	30,002	N/A	21,723	N/A	N/A	N/A
1978	N/A	NA	38,341	N/A	33,330	N/A	N/A	N/A
1979	8,016	14,122	22,138	N/A	27,977	N/A	N/A	N/A
1980	10,734	19,920	30,654	N/A	41,825	N/A	N/A	N/A
1981	10,740	16,013	26,753	N/A	27,548	N/A	N/A	N/A
1982	15,166	25,369	40,535	N/A	29,318	N/A	N/A	N/A
1983	16,725	17,568	34,293	33%	18,729	33%	N/A	N/A
1984	13,135	20,556	33,691	35%	27,077	47%	N/A	N/A
1985	8,568	11,169	19,737	24%	6,240	18%	N/A	N/A
1986	10,688	18,669	29,357	31%	7,862	30%	N/A	N/A
1987 ^b	10,667	12,605	23,272	22%	2,681	11%	N/A	N/A
1988 ^{b,c}	9,677	16,244	25,921	22%	4,582	13%	N/A	N/A
1989 ^{b,c}	10,014	20,317	30,331	23%	12,635	33%	N/A	N/A
1990 ^{b,c,d}	6,949	18,957	25,906	20%	4,439	27%	32,831	27%
1991 ^{b,c,d,e}	8,591	12,547	21,138	20%	3,719	20%	29,548	30%
1992 ^f	4,983	7,383	12,633	16%	0	0%	21,196	27%
1993 ^f	6,018	15,383	21,589	21%	0	0%	44,033	35%
1994 ^f	7,912	18,718	27,061	27%	114	1%	60,539	35%
1995 ^f	13,319	23,219	37,220	26%	212	2%	39,816	37%
1996 ^f	15,214	29,555	45,928	29%	0	0%	50,083	40%
1997 ^f	11,381	16,957	28,873	32%	0	0%	98,628	48%
1998 ^f	10,826	15,277	27,910	34%	0	0%	87,243	49%
1999 ^f	18,909	20,834	40,435	35%	0	0%	86,220	55%
2000 ^f	10,111	11,918	22,029	25%	0	0%	43,844	47%
2001 ^f	6,381	12,346	19,177	30%	0	0%	35,881	50%
2002 ^f	6,298	14,017	20,315	26%	0	0%	51,065	40%

-continued-

Table 14.-Page 2 of 2.

Year	Upper Chena Effort ^a	Lower Chena Effort ^a	Total Effort ^a	Effort as % of LTMA Effort	Grayling Harvest	Harvest as % of LTMA Grayling Harvest	Grayling Catch	Catch as % of LTMA Grayling Catch
Averages								
1979-1986	11,547	17,923	29,645		23,322		NA	NA
5-Yr Average: 1997-2001	11,641	15,310	27,685	31%			73,204	48%
2002 as % of 5-Year Avg	54%	92%	73%				60%	

^a Effort is for combined Chena River fisheries - grayling, burbot, northern pike, salmon, etc, and total effort will exceed sum of upper and lower river because effort not specified to either area has been added.

^b Special regulations were in effect during 1987 through 1991. These regulations were: catch-and-release fishing from 1 April until the first Saturday in June; a 305 mm (12 inch) minimum length limit; and, a restriction of terminal gear to unbaited artificial lures.

^c In addition to the special regulations, a catch-and-release area was created on the upper Chena River (river km 123 to 141).

^d The daily bag and possession limits were reduced from 5 fish to 2 fish in 1990.

^e During 1991, the Chena River and its tributaries were closed to possession of Arctic grayling from 1 July through 31 December.

^f Since 1992, the grayling fisheries in the Chena River and its tributaries have been restricted to catch-and-release.

^g NA – not available.

As a result of a population decline of Arctic grayling in the upper Chena River beginning in the mid-1980s, harvest decreased 76% from 1984 to 1985, although effort declined only 39% during that same period. Stock assessment projects began in the Chena River in the early 1970s. Electrofishing boats (shocker boats) were the primary tool for collecting fish. The methodology evolved to entail an annual mark-recapture abundance estimate using two boats simultaneously to sample most of the width of the river. Two passes by the two boats over the lower 90 miles of the river were required.

Between 1986 (Clark and Ridder 1987) and 1987 (Clark and Ridder 1988) population abundance declined 49%. As the population declined, more restrictive regulations were implemented. The bag limit was reduced (from 10 per day to five per day), fishing was restricted to catch-and-release during the spring spawning period, and the use of bait was eliminated in 1987.

Although harvest decreased for 2 years after the imposition of these restrictions, and abundance estimates increased, both harvest and effort increased substantially in 1989, prompting the lowering of the bag limit from five per day to two per day. This additional restriction was not sufficient to reduce harvest to sustainable levels, and in 1991 the fishery was further restricted to catch-and-release only. The grayling population in the Chena River appeared to be rebuilding during the early 1990s. Abundance (using estimates of abundance of grayling 150 mm FL and larger within the lower 90 miles of the river) rose and peaked in the mid - 1990s, with abundance estimates increasing to 45,000 fish in 1995 (Table 15). Subsequently, estimated abundance declined, decreasing between 1995 and 1997 (Ridder 1999). Abundance was estimated for Arctic grayling in the lower 90 miles (150 km) of the Chena River during 1998 (Ridder 1999). The estimate for 1998 was 27,565 fish over 150 mm in length, which represents a 23% decrease from the estimate of 1997, and a 30% decrease from the estimate of 1996. Age and size composition of Arctic grayling sampled during 1998 indicated that there was little decrease in the number of fish age-5 and older, but that the number of fish younger than 5 years old had dropped substantially from the 1997 estimate. Abundance of larger, older fish (age-5 and older) appeared to be trending upward.

Because harvest was ending at the same time that the SWHS began reporting both catch and harvest, little inference can be made about the proportion of catch that was harvested. Catches of Arctic grayling in the Chena River are trending upward and represented between 35% and 49% of all grayling caught in the LTMA between 1994 and 1998, reaching an all-time high of over 98,000 fish in 1997. Average contribution to total LTMA grayling catch during that period was 42% (Table 14). Catches may be trending downward but remain a mainstay of the total LTMA grayling catch, at 50% during 2001 and 40% during 2002. Estimated catch of about 51,000 in 2002 is 60% of the 1997 – 2001 average of about 73,000.

FISHERY MANAGEMENT OBJECTIVES

There is currently no Management Plan in place for Arctic grayling in the Chena River. There was a Chena River Arctic Grayling Conservation and Rehabilitation Plan adopted in 1992. That plan is no longer in effect. The rehabilitation enhancement efforts outlined in the plan proved to be unsuccessful, and are no longer being undertaken.

A management planning process began in 1999 and 2000. It was designed to assess public opinion and provide opportunities based on it, consistent with conservation of the resource. Strong public sentiment exists for maintaining catch-and-release fishing for grayling in the Chena River. A draft Chena River Grayling Management Plan has been written and is available

for review. Also, at the request of the BOF, a Regional grayling management plan has been formulated and is being presented to the BOF for consideration in January, 2004. It creates a framework for categorizing all grayling fisheries and offers regulatory options for the categories. The Chena River Grayling Management Plan will be finalized in a form consistent with that overall Regional plan.

Table 15.-Estimated abundance ^{a, b} of Arctic grayling within the assessed section (river mile 5 to river mile 90) of the Chena River, 1987 - 1998.

Year	Estimated Abundance
1987	29,891
1988	22,204
1989	19,028
1990	31,815
1991	26,756
1992	29,649
1993	39,618
1994	44,375
1995	45,114
1996	41,463
1997	35,837
1998	27,565

^a Abundance is for fish age-150 mm FL and longer.

^b Data from Ridder (1998) and B. Ridder, Fishery Biologist, retired, ADF&G, Delta; personal communication.

RECENT FISHERY PERFORMANCE (2001 – 2002 SUMMARY AND AVAILABLE INFORMATION FOR 2003)

2001 - 2002 Summary

Effort in the both the lower and upper Chena was stable during 2001 and 2002, together producing about 20,000 days fished each year (Table 14). Effort trends mirrored those for the rest of the LTMA (Table 2) Catch was down from the levels of the mid-1990s, but increased in 2002. Total grayling catch in 2002 (51,065 fish) was 60% of the 1997-2001 5-year average of about 73,000 grayling.

2003 Fishery (Preliminary)

The same flood events that adversely impacted the efforts to count Chinook salmon during mid-summer made the Chena River unfishable for grayling during those periods. There was at least one additional high-water event in early fall. Effort and catch will not likely show much increase in 2003.

FISHERY MANAGEMENT ACTIVITIES/RESULTS

As well as eliminating sport harvest through regulation changes, the department initiated a program of stock enhancement, stocking hatchery and pond-reared Arctic grayling, spawned from Chena River stock. Approximately 61,000 fish (each year) were stocked in the 100 river miles of the Chena River during 1993 and 1994. Survival of these fish was estimated as part of ongoing stock assessment efforts during 1993, 1994, and 1995. Survival of introduced fish was determined to be too low to justify the cost of the enhancement effort and stocking was not continued after 1994 (Clark 1994, 1995 and 1996). Other management activities related to this fishery in the last several years have involved public education regarding the stock status and the current regulations. Regulatory signs have been posted at angler-access sites along the river, and information on catch-and-release techniques has been provided at campgrounds in the Chena River State Recreation Area. Management planning is proceeding. There has been a major planning process, which is described elsewhere in this section.

BOF ACTIONS

A proposal to allow harvest of grayling in the Chena River has been submitted to the BOF for the January, 2004 meeting. The proposal, which would permit harvest of grayling with a bag and possession limit of one fish during June 1 – July 15 in the reach of the Chena River downstream from the Nordale Road Bridge, was submitted by the Fairbanks Fish and Game Advisory Committee (FAC). At two public meetings of the FAC considerable opposition was expressed, and there was no public support. The department staff advised the FAC that the fishery might be better served if the planning processes were completed before new regulations were written for the Chena River. The FAC voted to withdraw their proposal. Staff comments on this proposal are in Appendix B.

FISHERY OUTLOOK

The grayling fishery on the Chena River remains catch-and-release only. Overall abundance has not been assessed recently. Effort is stable, and catch is high. The catch-and-release fishery is prompting some concern over the amount of hooking mortality the stock can sustain. There has been little pressure from user groups to re-open the river to consumptive harvest.

ONGOING AND RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Division of Sport Fish conducted research on the stock status of Arctic grayling annually in the Chena River from 1971 to 1998. Early research produced abundance estimates in index sections of the river, but research since the late 1980s has involved estimating the abundance for the lower 90 miles of river. In addition to conducting ongoing stock assessment of Arctic grayling in the Chena River, a radio-telemetry project investigating the contribution of fish upstream of the assessment area to the overall spawning stock was completed.

Major stock assessment efforts on Arctic grayling in the entire lower 90 miles of the Chena River have been suspended since 1998. A stock assessment project was done and densities were determined within a 12 mile reach of the North Fork in 2002 (Wuttig 2004). There were about 113 grayling (11 inches or larger in total length) per mile.

There is some sentiment within the department and from the public that the annual assessments should continue for the purpose of maintaining an unbroken stock status history of Chena River grayling. Electrofishing boats have been used annually to collect grayling in the Chena River for

almost 30 years, and still are used occasionally in parts of the river when research on other species is conducted. While some narrowly-focused research on the effects of electrofishing has been done, no studies have assessed the impact on an entire river ecosystem. The impacts on target species such as grayling are minimized as much as possible through refinements in methodology, and those impacts are deemed to be an acceptable cost of obtaining stock status information. Nevertheless, the impacts on the target species and the collateral effects on all other animals within the range of the electrical field are not beneficial, are not neutral, and are likely detrimental. To what degree is unknown. While no immediate catastrophic impact is evident, there are likely subtle impacts that may cumulatively be greater in some aspects than impacts of natural events (such as abnormal river stages), or that may act in concert with such events. While an unbroken data set might be valuable, the potential benefits of not subjecting the vertebrate and invertebrate species in the lower 90 miles of the river to annual electroshocking should be considered.

A full-scale assessment of the grayling stock status in the lower 90 miles of the Chena River was scheduled for 2003. However, funding and staffing are available to do only one major grayling stock assessment in the LTMA per year. Timing of the effort is also a consideration, since electrofishing should be avoided in mid-summer when adult Chinook salmon are in the river. No stock assessment had been done on the Salcha River grayling stock since 1993, and only about one third of the reach that anglers commonly travel to with boats to go fishing had ever been assessed. Obtaining a more complete and current assessment of the Salcha River stock was considered a higher priority, and the Chena study was postponed. Consequently, a stock assessment within the lower Chena River is becoming a higher priority.

Effort and catch will be monitored through the SWHS.

SECTION VII: PILEDRIVER SLOUGH ARCTIC GRAYLING FISHERY

BACKGROUND AND HISTORICAL PERSPECTIVE

Piledriver Slough is a clearwater stream that flows for some 21 miles parallel to and between the Richardson Highway and the Tanana River adjacent to Eielson Air Force Base. It was originally a slough of the (glacial) Tanana River and headwaters of Chena Slough, which flowed from the mainstem of the Tanana River north and west through Fairbanks. A dike was built at Moose Creek in the 1940s, cutting Chena Slough off from the Tanana River and creating Badger Slough and the lower Chena River as the non-glacial systems that exist today. The Chena River became a rapid-runoff stream along its entire length and Badger Slough is characterized as a "groundwater" or "spring-fed" system supplied by the aquifers of the Tanana and Chena rivers. Piledriver Slough remained as a turbid side slough of the Tanana River. During the early stages of the construction of the Chena Lakes Flood Control Project by the Army Corps of Engineers (COE) in 1975, dikes were constructed cutting off the headwaters of Piledriver Slough from the Tanana River. The lower section of Piledriver Slough below Moose Creek was routed through a series of slough channels and man-made channels to avoid the floodway and associated dikes. Piledriver Slough then became a system fed by upwellings analogous to Badger Slough, with silty water from the Tanana River flowing only when the Tanana is extremely high or there are ice jams, causing flooding in the area of the headwater dikes. Moose Creek is a tannic-stained tributary to Piledriver Slough, entering it about three river miles upstream from its confluence with the Tanana. Because the dikes were built for the purpose of protecting the main flood

control project from Tanana River flooding until construction of the main flood control project was completed, the COE has in the past taken the position that they are no longer needed and will not be maintained. This issue arose when the Tanana River was cutting a channel that had the potential to break into Piledriver Slough in the area of the dikes and return the slough to its original, glacial condition.

The slough is road accessible at several points, and there are rural neighborhoods along the upper reaches. The middle section flows through part of the Eielson Air Force Base reservation, and an easily obtained permit is required by the military for access. It can be traversed with a canoe or light inflatable boat, but powerboats can be used only on the lower 3-miles. The clarity of the water creates the best possible visibility conditions for anglers looking for fish, and the stream can be crossed on foot readily in most reaches.

When Piledriver Slough became a clear stream, fish species common to clear streams within the LTMA colonized it. They were likely present when glacial water flowed through, but most probably utilized it primarily as an overwintering area and migratory corridor. Piledriver Slough seasonally supports populations of or is visited by: Arctic grayling *Thymallus arcticus*, round whitefish *Prosopium cylindraceum*, humpback whitefish *Coregonus pidschian*, least cisco *C. sardinella*, northern pike *Esox lucius*, burbot *Lota lota*, longnose suckers *Catostomus catostomus*, slimy sculpins *Cottus cognatus*, lake chubs *Couesius plumbeus*, Arctic lamprey *Lampetra japonica*, and a few sheefish *Stenodus leucichthys*. A few chum salmon *O. keta* spawn there, and the slough is stocked annually with (sterile all-female triploid) rainbow trout. Grayling, rainbow trout, whitefish, pike, burbot, and sheefish are taken in the sport fishery.

The grayling that became established as a spawning stock after the dikes were built at the upper end were likely Moose Creek fish. A relatively large Arctic grayling fishery has developed at Piledriver Slough since the late 1970s (Table 16). Anglers have been attracted to the fishery by the easy availability of grayling and the only stream fishery for rainbow trout north of the Alaska Range. The small numbers of large predators (pike, burbot, and sheefish) and whitefish are present in the lower 3 miles (from Moose Creek downstream). While they add diversity to the fishery, the primary focus of anglers is the grayling/rainbow trout fishery. Both species inhabit the same waters and are taken with the same gear, so effort cannot be segregated. Effort at Piledriver Slough increased dramatically from the mid-1980s to 1990, and then began a declining trend that continues (Table 17). Grayling stock declines and regulatory restrictions may be partially responsible for the decline, but examination of Tables 16 and 17 indicate that catch rate is variable with no clear trend.

Because of concerns about the vulnerability of the grayling to increasing fishing effort, in 1987 a 12 inch minimum size limit was implemented and the use of bait on small hooks eliminated at Piledriver Slough below its confluence with Moose Creek. Grayling fishing in the same area of Piledriver Slough was restricted to catch-and-release only in 1993.

Grayling abundance at Piledriver Slough declined dramatically between 1992 and 1997, with estimated abundance falling almost in half from about 14,000 to about 8,700 (Fleming 1997a, 1998a). However, density (fish per km) was 627, higher than the 1990 density of 530 and near the 7-year average of 620. Between 1991 and 1996, the amount of habitat available to Arctic grayling for spawning and rearing at Piledriver Slough has fallen by a little over half, due to the construction of several large beaver dams blocking fish passage. As long stretches of Piledriver Slough became devoid of fish, angling opportunity was also reduced. This habitat loss has been

Table 16.-Estimated sport catch and harvest of Arctic grayling in Piledriver Slough and in all LTMA fisheries, 1983-2002.

Year	Piledriver Slough		LTMA Total	
	Catch	Harvest	Catch	Harvest
1983	N/A	5,822	N/A	60,748
1984	N/A	3,751	N/A	61,560
1985	N/A	N/A	N/A	37,611
1986	N/A	N/A	N/A	30,398
1987	N/A	4,907	N/A	24,723
1988	N/A	8,095	N/A	36,489
1989	N/A	4,459	N/A	39,407
1990	38,480	2,380	122,342	17,732
1991	20,815	3,987	98,562	18,503
1992	15,252	1,030	78,820	8,275
1993	32,036	759	127,383	11,377
1994	31,324	57	171,968	11,826
1995	17,431	0	108,325	13,217
1996	16,667	0	123,971	5,073
1997	24,585	0	204,338	8,598
1998	24,203	0	179,855	5,914
1999	19,571	0	157,762	6,729
2000	7,224	0	92,462	4,829
2001	4,927	0	71,227	2,692
2002	8,199	0	119,845	11,101
10-Yr Average: 1992-2001	19,322	N/A	131,611	7,853
5-Yr Average: 1997-2001	16,102	N/A	141,129	5,752
2002 as % of 5-Year Avg.	51%	N/A	85%	193%

NA = not available.

Table 17.-Estimated angling effort expended at Piledriver Slough, 1983-2002.

Year	Angler Days
1983	4,148
1984	4,651
1985	N/A
1986	N/A
1987	13,257
1988	24,375
1989	22,746
1990	27,705
1991	17,703
1992	13,607
1993	17,253
1994	11,369
1995	12,613
1996	11,736
1997	6,791
1998	5,126
1999	8,955
2000	6,234
2001	5,190
2002	4,246
Averages	
1987-2001	13,644
10-Yr Average: 1992-2001	9,887
5-Yr Average: 1997-2001	7,768
2002 as % of 5-Year Avg.	55%

accompanied by a corresponding reduction in the estimated grayling abundance, but not a reduction in density.

FISHERY MANAGEMENT OBJECTIVES

The grayling fishery management objective in Piledriver Slough is to ensure that the fishery on the Arctic grayling population is sustainable. Management objectives will be more thoroughly addressed after the Regional Grayling Plan is finalized. A habitat management objective of restoring fish passage to upper reaches of the stream blocked by beaver dams is emerging.

RECENT FISHERY PERFORMANCE (2001 – 2002 SUMMARY AND AVAILABLE INFORMATION FOR 2003)

2001-2002 Summary

Effort continued to decline during 2001 - 2002, and is at 55% of the 5-year (1997-2001) average (Table 17). Grayling catch increased in 2002 but is still only at 51% of the 5-year average (Table 16), which is influenced by high catch rates in 1997 and 1998.

2003 Update

Piledriver Slough was subjected to periods of flooding in 2003 as the Tanana River overflowed its banks at the “headwaters” of the slough.

FISHERY MANAGEMENT ACTIVITIES/RESULTS

Grayling fishing in Piledriver Slough was restricted to catch-and-release only in 1993. Harvest of grayling has ended. Fishing mortality from the catch-and-release fishery is estimated to be less than 20%. The department has initiated a study to investigate the effect on Arctic grayling abundance and distribution of increasing the amount of habitat available to Arctic grayling in Piledriver Slough. The study will allow fish passage to areas of the slough not currently available to fish by removing several of the lower beaver dams, and will determine if grayling in Piledriver Slough begin to utilize the habitat that is no longer blocked to fish passage. In October of 1998, trappers were permitted to begin before the regular season to remove beavers in the farthest downstream sections of Piledriver in which fish passage was blocked by beaver dams. Immediately after freeze-up, the dams were breached down to the riverbed, and the ponds behind them drained. By late summer, 1999, adult and juvenile grayling had recolonized the areas upstream from the breached dams to the next solid dam (Wuttig 2000). The author of this report also observed whitefish, lake chubs, and rainbow trout immediately upstream from a breached dam. Trapping was evidently completely successful, because the dams were not repaired in 1999 or 2000. In early winter 1999, more dams were breached, with similar successful fish recolonization evident in summer 2000 (K. Wuttig, Sport Fish Biologist, ADF&G, Fairbanks; personal communication). In early winter of 2000, another dam was breached, opening a large area of Piledriver Slough to fish. As time allows, this project should continue.

BOF ACTIONS

The BOF adopted a department proposal during the 1997 meeting to change the codified regulation for Arctic grayling at Piledriver Slough to catch-and-release only. This change did not result in an actual change in regulations, since the regulation proposed by the department and adopted by the Board had already been in effect by EO since 1993. No regulatory proposals concerning Piledriver Slough were submitted for the January, 2004 BOF meeting.

FISHERY OUTLOOK

If grayling re-colonize the areas made available to them by beaverdam removal, density should decline as grayling spread out into the formerly barren areas. The catch rate might follow suit, particularly since the areas being re-opened to grayling are less accessible. Abundance might increase as grayling take advantage of more available spawning areas.

ONGOING AND RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Evaluation of grayling distribution upstream from removed beaver dams will continue. Stock assessment should be undertaken after the dam removal project has evolved into a maintenance phase and grayling distribution appears stable. Catch, harvest, and effort will be monitored through the SWHS. Stock status should be monitored on a regular basis to measure changes in the population. A management plan should be developed that sets thresholds for regulatory action if stocks should decline, and reinstates opportunity when stocks recover. Examination of stomach contents of rainbow trout sampled in the proximity of large numbers of grayling fry revealed that the trout were not preying upon grayling fry.

SECTION VIII: SALCHA RIVER ARCTIC GRAYLING FISHERY

BACKGROUND AND HISTORICAL PERSPECTIVE

The Salcha River is described generally in the section reporting on the Salcha River Chinook salmon fishery. The Salcha River Arctic grayling fishery has supported increasing catch and fairly consistent harvest over recent years and provides a substantial proportion of the harvest opportunity for grayling in the LTMA (Table 18). The majority of the grayling fishing opportunity is accessible only by boat, and a high proportion of the effort is from people who have property along the river, and their visitors. Some commercial guiding for Salcha River grayling is also taking place. The harvest was higher prior to the regulations that were imposed in 1989 instituting a 12-inch minimum length limit, restrictions on the use of bait, and the restriction to catch-and-release only during the spring spawning period. The restrictions, likely coupled with an attitude among anglers who fish there often that they need not harvest all of the fish they are legally entitled to in order to "get what they want", are probably causing the harvest rate (of fish over 12-inches in length that may be legally harvested) to remain steady. For example, in 1999 the catch of grayling over 12-inches in length (which could be legally harvested) was 9,243, and harvest was 1,524 (16%; Howe et al. 2001c, d). Overall, catch peaked at about 27,000 grayling in 1997, and harvest at about 3,000 fish, and both appear to be stabilizing at a lower level (Table 18).

Effort seems relatively stable (Table 19). Effort on this multi-species fishery is impacted by the quality of the Chinook salmon fishery from year to year, hydrological conditions that can at one extreme (high water) make grayling fishing very difficult and at the other (low water) limit boat access to fishing areas, and the weather and timing of breakup and freeze up (Table 18.). The low effort in 1992 is likely due in part to very bad weather that summer.

The most recent grayling stock assessment study was completed in 1993. Abundance was increasing (compared to estimates from 1990 - 1992) and indicators of good survival of younger fish were measured (Roach 1994).

Table 18.-Estimated sport catch and harvest of Arctic grayling in the Salcha River and in all LTMA fisheries, 1977-2002.

Year	Salcha River		LTMA Total	
	Catch	Harvest	Catch	Harvest
1977	N/A	6,387	N/A	N/A
1978	N/A	9,067	N/A	N/A
1979	N/A	5,980	N/A	N/A
1980	N/A	5,351	N/A	N/A
1981	N/A	3,983	N/A	N/A
1982	N/A	6,843	N/A	N/A
1983	N/A	9,640	N/A	60,748
1984	N/A	13,305	N/A	61,560
1985	N/A	5,826	N/A	37,611
1986	N/A	7,540	N/A	30,398
1987	N/A	4,762	N/A	24,723
1988	N/A	2,383	N/A	36,489
1989	N/A	5,721	N/A	39,407
1990	8,609	1,992	122,342	17,732
1991	4,697	1,688	98,562	18,503
1992	8,265	1,592	78,820	8,275
1993	11,254	1,768	127,383	11,377
1994	9,995	2,308	171,968	11,826
1995	12,173	2,685	108,325	13,217
1996	10,327	1,747	123,971	5,073
1997	27,307	2,959	204,338	8,598
1998	18,829	2,179	179,855	5,914
1999	13,932	1,524	157,762	6,729
2000	7,200	1,544	92,562	4,829
2001	5,831	602	71,227	2,692
2002	7,532	1,287	119,845	11,101
Averages				
1983-2001	N/A	3,451	N/A	20,133
10-Yr Average: 1992-2001	12,511	1,891	131,611	7,853
5-Yr Average: 1997-2001	14,620	1,762	141,129	5,752
2002 as % of 5-Year Avg.	52%	73%	85%	193%

NA = not available.

Table 19.-Estimated angling effort at the Salcha River,
1977-2002.

Year	Angler Days
1977	8,167
1978	9,715
1979	14,788
1980	8,858
1981	8,090
1982	14,126
1983	11,802
1984	8,449
1985	13,109
1986	13,792
1987	10,576
1988	7,494
1989	9,704
1990	9,783
1991	11,242
1992	4,833
1993	7,313
1994	7,653
1995	14,516
1996	13,046
1997	8,647
1998	5,789
1999	7,539
2000	4,862
2001	5,471
2002	5,954
Averages	
1977-2001	9,575
10-Yr Average: 1992-2001	7,967
5-Yr Average: 1997-2001	7,977
2002 as % of 5-Year Avg.	75%

FISHERY MANAGEMENT OBJECTIVES

The grayling fishery management objective in the Salcha River is to ensure that the fishery on the Arctic grayling population is sustainable. Management objectives will be more thoroughly addressed after the Regional Grayling Plan is finalized.

RECENT FISHERY PERFORMANCE (2001 – 2002 SUMMARY AND AVAILABLE INFORMATION FOR 2003)

2001-2002 Summary

Catch was relatively stable during 2000 – 2002 at between 5,800 and 7,500 fish (Table 18). The 2002 catch of 7,532 is 52% of the most recent 5-year average. Harvest declined disproportionately (related to catch) in 2001 to 600 fish, and was 1,300 grayling in 2002. Both were less than the 5-year average (1997-2001). Roughly 4,100 of the grayling caught in 2001 and 3,700 of those caught in 2002 were larger than 12". Effort in 2002 increased slightly from that of 2001 but was 75% of the 5 year average.

2003 Update

The same series of high water events that impacted the Chinook salmon counting projects in the LTMA made the Salcha River unfishable for grayling during some periods in mid- and late summer, possibly lowering catch and harvest. The Salcha River Arctic grayling stock is being utilized by commercial guiding operations. Impact is thought to be light at this time, with catch-and-release predominating.

FISHERY MANAGEMENT ACTIVITIES/RESULTS

The present regulatory regime seems to be conserving the grayling stocks and meeting the objectives.

BOF ACTIONS

BOF action on the Regional Grayling Management Plan may impact the Salcha River grayling regulations. An assessment of the value of the spring spawning period restriction to catch-and-release and the 12-inch minimum length limit for harvest may ensue.

FISHERY OUTLOOK

The grayling population should be able to sustain the current level of harvest unless biological factors such as a series of recruitment failures intercede.

ONGOING AND RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Catch, harvest, and effort will be monitored through the SWHS. A stock status assessment began in 2003 and will continue in 2004. It consists of an assessment of abundance and stock age structure, and a radiotelemetry study assessing movement and distribution throughout the section of the river most accessible to anglers (confluence of the Salcha and Tanana rivers upstream to near the confluence of the North Fork and Middle Fork). A management plan may be developed that sets thresholds for regulatory action if stocks should decline, and reinstates the present regulatory regime when stocks recover.

SECTION IX: CHATANIKA RIVER ARCTIC GRAYLING FISHERY

BACKGROUND AND HISTORICAL PERSPECTIVE

The Chatanika River, formed by the confluence of Faith, McManus, and Smith creeks about 50 miles northeast of Fairbanks, flows southwest out of the White Mountains for about 170 river miles and ends at its confluence with the Tolovana River in Minto Flats about 50 miles west of Fairbanks. The Chatanika River is a clear or lightly tannic stained rapid-runoff stream, and flows through valleys between summits and uplands for about four-fifths of its length before it enters Minto Flats. At that point the character of the river changes from one typical of rapid-runoff upland streams with pools, riffles, cutbanks and gravel bars and a substrate consisting largely of gravel or broken rock to a slower stream with an incised channel with high, fairly stable banks and a bottom substrate consisting primarily of sand and organic material. Mining activity dominated the upper Chatanika during the first half of the 20th century. A diversion dam one mile below Faith Creek blocked fish passage for many years, though the dam no longer served any purpose. The dam was removed in early 2002.

The Chatanika River supports populations of: Arctic grayling *Thymallus arcticus*, Chinook salmon *Oncorhynchus tshawytscha*, chum salmon *O. keta*, round whitefish *Prosopium cylindraceum*, humpback whitefish *Coregonus pidschian*, broad whitefish *Coregonus nasus*, least cisco *C. sardinella*, northern pike *Esox lucius*, burbot *Lota lota*, sheefish *Stenodus leucichthys*, longnose suckers *Catostomus catostomus*, slimy sculpins *Cottus cognatus*, lake chubs *Couesius plumbeus*, Alaska blackfish *Dallia pectoralis*, and Arctic lamprey *Lampetra japonica*. Grayling, Chinook and chum salmon, and humpback and round whitefish, and least ciscos are the focus of sport fishing effort upstream of Minto Flats. Pike and burbot are the mainstay of the Chatanika River sport fishery within Minto Flats, and small numbers of sheefish are taken in Minto Flats and in the lower portions of the Chatanika within the uplands.

The Chatanika River is paralleled by the Steese Highway along its upper 50 river miles. The Elliot Highway crosses it about 60 river miles upstream from Minto Flats, and the Murphy Dome Road ends at the Chatanika River about 3 miles upstream from Minto Flats. The river downstream from the Elliot Highway bridge is used by anglers traveling in powerboats. There are boat landings at the Elliot Highway bridge and at the Murphy Dome Road. Boaters also travel from Nenana down the Tanana River or from Manley up the Tanana River to get into Minto Flats and upstream into the Chatanika River. There is a boat launch at Minto Village into the Tolovana River, a short distance from the Chatanika River in Minto Flats. The upper Chatanika River is also a popular float trip. The majority of this is upstream from the Elliot Highway bridge, with some float trips downstream to the Murphy Dome Road and very few into Minto Flats.

The grayling sport fishery has been documented and studied since the 1950s and has probably been in existence in one form or another since the gold rush in the early 1900s. The grayling population undoubtedly went through periods of severe decline while either or both fishing and mining activity were unrestricted. We cannot say to what extent the stock has subsequently recovered, but it supports what is considered to be a viable but low density grayling population and stock assessments of Arctic grayling have been done periodically in the Chatanika River since the mid-1980s. The current regulatory regime for grayling fishing (a spring spawning

period closure and a 12-inch minimum length limit, both throughout the drainage, and no use of bait upstream of the Elliot Highway bridge) was implemented beginning in 1992.

In the upper river, anglers focus almost entirely on grayling while in the lower river, grayling, pike, burbot, sheefish, salmon, and whitefish share the effort. Since 1995, the SWHS has provided effort, catch, and harvest estimates for the "Upper Chatanika" and "Lower Chatanika", with the river divided at the Elliot Highway Bridge. Tables 20 and 21 present whole river estimates, as they were reported from 1977 through 1994. Effort is fairly evenly split between the Upper River and Lower River. Catch and harvest trends have not diverged markedly between the two river sections during 1995-2001. Up to 2001, effort, catch, and harvest have shown a declining trend from highs in the early to mid-1990s.

Stock assessments have been done periodically in the Chatanika River, most recently in 1997 and 2002. The researchers reported no immediate conservation problem for Chatanika River grayling, but stream productivity is low (Fleming 1998b; Wuttig 2004). Grayling densities were low in the Upper River but mortality rate appeared to be lower than expected, based on recovery rate in 2002 of grayling tagged in 1997. Concerns were expressed about the potential for stock depletion in the upper river should fishery mortality increase.

FISHERY MANAGEMENT OBJECTIVES

The primary fishery management objective for the Chatanika River is to ensure that harvests and incidental mortality for all species are sustainable. Management objectives will be more thoroughly addressed after the Regional Grayling Plan is finalized.

RECENT FISHERY PERFORMANCE (2001 – 2002 SUMMARY AND AVAILABLE INFORMATION FOR 2003)

2001-2002 Summary

Catch was declining during 2000 – 2001 at about 9,200 and 3,000 fish respectively, but increased drastically to about 15,000 (118% of the most recent 5-year average) during 2002 (Table 20). The 2002 catch was out of proportion with the moderate increase in effort (Table 21). Estimated harvest increased from 773 in 2000 and 317 in 2001 to about 1,350 in 2002 (135% of the most recent 5-year average).

2003 Update

The same series of high water events that impacted the Chinook salmon counting projects in the LTMA made the Chatanika River unfishable for grayling during some periods in mid- and late summer, possibly lowering catch and harvest. The second of these events, in late July, was a major flood event with the river well over its banks. Impact on Chatanika River fish stocks is unknown.

Table 20.-Estimated sport catch and harvest of Arctic grayling in the Chatanika River and in all LTMA fisheries, 1977-2002.

Year	Chatanika River		LTMA Total	
	Catch	Harvest	Catch	Harvest
1977	N/A	6,737	N/A	N/A
1978	N/A	9,284	N/A	N/A
1979	N/A	6,121	N/A	N/A
1980	N/A	5,143	N/A	N/A
1981	N/A	3,808	N/A	N/A
1982	N/A	6,445	N/A	N/A
1983	N/A	9,766	N/A	60,748
1984	N/A	4,180	N/A	61,560
1985	N/A	7,404	N/A	37,611
1986	N/A	2,692	N/A	30,398
1987	N/A	5,619	N/A	24,723
1988	N/A	8,640	N/A	36,489
1989	N/A	6,934	N/A	39,407
1990	17,960	4,237	122,342	17,732
1991	12,830	2,642	98,562	18,503
1992	11,750	1,751	78,820	8,275
1993	14,283	2,001	127,383	11,377
1994	24,750	2,659	171,968	11,826
1995	15,859	2,108	105,251	16,291
1996	11,928	420	123,971	5,073
1997	24,484	1,550	204,338	8,598
1998	14,384	915	179,855	5,914
1999	13,851	1,462	157,762	6,729
2000	9,204	773	92,562	4,829
2001	3,002	317	71,227	2,692
2002	15,313	1,357	119,845	11,101
Averages				
1983-2001	N/A	3,477	N/A	20,133
10-Yr Average: 1992-2001	14,350	1,396	131,611	7,853
5-Yr Average: 1997-2001	12,985	1,003	141,129	5,752
2002 as % of 5-Year Avg.	118%	135%	85%	193%

NA = not available.

Table 21.-Estimated angling effort at the Chatanika River, 1977-2002.

Year	Angler Days
1977	9,925
1978	10,835
1979	4,853
1980	5,576
1981	4,691
1982	9,417
1983	10,757
1984	8,605
1985	10,231
1986	7,783
1987	11,065
1988	11,642
1989	12,210
1990	11,801
1991	8,085
1992	6,775
1993	7,671
1994	7,272
1995	13,145
1996	12,032
1997	7,125
1998	6,000
1999	8,747
2000	5,748
2001	2,680
2002	3,844
Averages	
1977-2001	8,800
10-Yr Average: 1992-2001	7,720
5-Yr Average: 1997-2001	7,930
2002 as % of 5-Year Avg.	48%

FISHERY MANAGEMENT ACTIVITIES/RESULTS

The present regulatory regime appears to be maintaining a sustainable grayling fishery. Concerns about potential future overharvest will likely be addressed after the BOF addresses the Regional Grayling Management Plan.

BOF ACTIONS

BOF action on the Regional Grayling Management Plan may impact the Chatanika River Grayling Regulations. An assessment of the value of the spring spawning period restriction to catch-and-release and the 12 inch minimum length limit for harvest may ensue.

FISHERY OUTLOOK

The grayling population should be able to sustain the current level of harvest unless biological factors such as a series of recruitment failures intercede.

ONGOING AND RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Catch, harvest, and effort will be monitored through the SWHS. Stock status of the road-accessible portion of the fishery should be monitored regularly. A management plan should be developed that sets thresholds for regulatory action if stocks should decline, and restores opportunity when stocks recover.

SECTION X: OTHER WILD STOCK ARCTIC GRAYLING FISHERIES

BACKGROUND AND HISTORICAL PERSPECTIVE

Arctic grayling are popular with recreational anglers, are generally abundant, and occur in many LTMA rivers and streams besides the major fisheries previously detailed (stocked grayling present in lakes are not described in this section). These other waters include high gradient Alaska Range streams such as Brushkana Creek along the Denali Highway and other upper Nenana River streams, groundwater/aquifer-fed lowland streams such as Julius Creek in the lower Nenana River drainage, and rapid-runoff streams through a variety of terrain such as Washington Creek and the Little Salcha River. Access ranges from roadside fisheries to those accessible only by traveling by boat along major rivers to the mouth of the tributary containing grayling. As with almost all grayling fisheries in the Tanana River drainage, these fisheries take place during the open-water season. With the exception of Five Mile Clearwater, the grayling fisheries in these streams fall under the background regulation for Arctic grayling in the Tanana River drainage (5 fish daily and in possession with no size limit) that was instituted in 1975. Much of the reported catch from these fisheries is released rather than harvested (Table 22). With the exception of Brushkana Creek, these fisheries have attracted little research effort. Estimates of angler effort directed toward grayling can be developed if necessary for some of these streams in which the grayling are the focus of the fishery, but collectively effort upon these grayling stocks cannot be estimated due to the mix of species targeted by anglers in these streams. Depending on stream characteristics, all of the stream-resident species targeted by anglers within the Tanana River drainage are present in this aggregation of flowing waters. Estimates of effort, catch, and harvest for these waters are somewhat less reliable than those for the major fisheries because the estimates for the smaller fisheries are often based on a small number of responses to the SWHS questionnaire. Nevertheless, the trend information is useful and may provide a history of a fishery if conservation concerns become an issue.

Catch and harvest vary considerably, in part because many of these small fisheries enter and drop out of the SWHS report from 1 year to the next, depending upon whether any of the small number of anglers utilizing them are selected for inclusion in the SWHS. Catch and harvest

Table 22.-Estimated sport catch and harvest of Arctic grayling in other wild stock LTMA stream fisheries, 1977-2002.

Year	Other Wild Stock Stream Fisheries		LTMA Total	
	Catch	Harvest	Catch	Harvest
1983	N/A	13,074	N/A	60,748
1984	N/A	6,574	N/A	61,560
1985	N/A	15,318	N/A	37,611
1986	N/A	10,192	N/A	30,398
1987	N/A	5,115	N/A	24,723
1988	N/A	9,465	N/A	36,489
1989	N/A	5,850	N/A	39,407
1990	18,750	3,527	122,342	17,732
1991	24,624	4,840	98,562	18,503
1992	15,671	2,896	78,820	8,275
1993	15,254	4,251	127,383	11,377
1994	24,070	3,877	171,968	11,826
1995	13,965	6,285	108,325	13,217
1996	21,608	2,311	123,971	5,073
1997	16,471	3,243	204,338	8,598
1998	19,517	1,480	179,855	5,914
1999	10,863	1,724	157,762	6,729
2000	11,794	1,341	92,562	4,829
2001	11,474	598	71,227	2,692
2002	32,213	4,507	119,845	11,101
Averages				
1983-2001	N/A	4,938	N/A	20,133
10-Yr Average: 1992-2001	16,069	2,801	131,611	7,853
5-Yr Average: 1997-2001	14,024	1,677	141,129	5,752
2002 as % of 5-Year Avg.	230%	269%	85%	193%

^a NA = data not available.

from these streams is a major component of the total LTMA grayling fishery (Table 22). The trends seem stable within a wide range. During the late 1990s estimated catch generally declined, while harvest was relatively stable.

FISHERY MANAGEMENT OBJECTIVES

There are no management plans for any of these fisheries. The "default" objective is to conserve the stocks while maintaining angler opportunity at a sustainable level. Management objectives will likely be more thoroughly addressed after the Regional Grayling Plan is finalized.

RECENT FISHERY PERFORMANCE (2001 – 2002 SUMMARY AND AVAILABLE INFORMATION FOR 2003)

2001-2002 Summary

Catch was stable during 2000 – 2001 at about 11,500 fish, but increased drastically to about 32,000 (230% of the most recent 5-year average) during 2002 (Table 22). The 2002 catch was out of proportion with the moderate increase in effort in the LTMA generally (Table 2). Estimated harvest increased from 1,341 in 2000 and 598 in 2001 to about 4,507 in 2002 (269% of the most recent 5-year average). These estimates should be viewed with caution, however, since they represent a group of fisheries that can vary in location and total number from year to year. The increase in 2002 is consistent, however, with the general increase in grayling catch and harvest in the LTMA on 2002.

2003 Update

There is no information for 2003.

FISHERY MANAGEMENT ACTIVITIES/RESULTS

The present regulatory regime appears to be maintaining a sustainable grayling fishery. Concerns about potential future overharvest will likely be addressed after the BOF addresses the Regional Grayling Management Plan.

BOF ACTIONS

BOF action on the Regional Grayling Management Plan may impact the LTMA background Grayling Regulations.

FISHERY OUTLOOK

Localized depletions can occur in fisheries of varying intensities on small, unassessed stocks subject to background regulations.

ONGOING AND RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Catch, harvest, and effort will be monitored through the SWHS. Stock status of fisheries for which concerns arise may be assessed, with management actions ensuing as appropriate. A research project assessing stock age/sex structure and distribution and movement (utilizing radiotelemetry) of Brushkana Creek grayling is being completed.

SECTION XI: TOLOVANA RIVER DRAINAGE/MINTO FLATS/LOWER CHATANIKA RIVER NORTHERN PIKE FISHERY

BACKGROUND AND HISTORICAL PERSPECTIVE

Minto Flats, located about 30 miles west of Fairbanks, is an approximately 500,000-acre area of marsh and lakes interconnected by numerous sloughs and several rivers. Most of the area is included in the Minto Flats Game Refuge, and is one of the most important waterfowl nesting areas in the Tanana River drainage. The Chatanika, Tolovana, and Tatalina rivers and Washington, Goldstream, and numerous smaller creeks flow into Minto Flats, coming together as tributaries to the Tolovana River, itself a tributary to the Tanana River at its mouth at the southwestern end of the Flats. The glacial Tanana River forms the southern boundary of Minto Flats, and two major sloughs of the Tanana (Swanneck Slough and Grassy Slough) cut into the flats and flow into the lower Tolovana River. Except for the Tanana River, the waterways of the flats are slow and meandering. The lakes of Minto Flats are generally shallow and heavily vegetated. A group of interconnected lakes in the eastern flats, connected to Goldstream Creek, are called the Minto Lakes. The Minto Lakes are a major northern pike spawning and summer feeding area within Minto Flats. Big Minto Lake and Upper Minto Lake are the largest of these lakes. The surface area of the standing waters of Minto Flats varies drastically from summer to summer and sometimes within each summer, depending on the volume of tributary streams and the stage of the Tanana River. Summer habitat for northern pike in Minto Flats covers about 27,000 acres. In winter much of the flowing and standing water within the flats becomes anoxic, forcing fish to move to waters of the Tanana River or up tributary rivers to oxygenated areas. Winterkill is common, and can be a confounding factor in attempts to predict fish population dynamics and assess angler impact.

Fish species present in the lakes and waterways as residents for either part of the year or as migrants include northern pike *Esox lucius*, burbot *Lota lota*, sheefish *Stenodus leucichthys*, humpback whitefish *Coregonus pidschian*, broad whitefish *Coregonus nasus*, least cisco *C. sardinella*, Arctic grayling *Thymallus arcticus*, Chinook salmon *Oncorhynchus tshawytscha*, chum salmon *O. keta*, round whitefish *Prosopium cylindraceum*, longnose suckers *Catostomus catostomus*, slimy sculpins *Cottus cognatus*, lake chub *Couesius plumbeus*, Alaska blackfish *Dallia pectoralis*, and Arctic lamprey *Lampetra japonica*. The salmon are migrants through Minto Flats and the lower Chatanika River, traveling to and from spawning grounds in the middle and upper Chatanika River. The grayling and round whitefish are primarily residents of the rivers and streams beyond the periphery of Minto Flats, but some likely travel through Minto Flats to and from overwintering areas in the Tanana River. The northern pike fishery of the lower Chatanika River (described in the SWHS reports as downstream from the Elliot Highway bridge) is included in this section because the Minto Lakes and Chatanika River northern pike stocks are commingled, the fisheries overlap, and the lower 35 miles of the Chatanika River is within Minto Flats. It is impractical to treat them separately. General references to Minto Lakes pike within this section, then, include the Chatanika River within the flats, downstream from the Murphy Dome Road. Similarly, because effort, catch, and harvest estimates for the Tolovana River appear occasionally in the SWHS data, and Minto Flats and all of its waters are within the Tolovana River drainage and are regulated as such, Table 23 contains all-inclusive columns of catch and harvest for the Tolovana River drainage (Tolovana River, Minto Flats, and the lower

Table 23.-Sport catch and harvest of northern pike in the Tolovana - Minto Flats complex^a and the LTMA, 1983-2002.

Year	Tolovana River		Lower Chatanika River		Minto Flats		Tolovana - Minto Flats Complex ^a		LTMA Total	
	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1983	N/A	N/A	N/A	713	N/A	2,748	N/A	3,461	N/A	7,898
1984	N/A	286	N/A	389	N/A	2,453	N/A	3,128	N/A	6,357
1985	N/A	347	N/A	763	N/A	4,146	N/A	5,256	N/A	8,224
1986	N/A	279	N/A	1,282	N/A	4,927	N/A	6,488	N/A	8,112
1987	N/A	66	N/A	554	N/A	1,781	N/A	2,401	N/A	6,105
1988	N/A	109	N/A	364	N/A	1,492	N/A	1,965	N/A	7,599
1989	N/A	50	N/A	812	N/A	1,734	N/A	2,596	N/A	8,310
1990	135	51	979	388	4,946	1,570	6,060	2,009	23,964	5,414
1991	164	30	520	401	5,427	2,155	6,111	2,586	23,037	9,426
1992			410	26	6,175	1,299	6,585	1,325	24,477	4,200
1993			4,842	1,344	19,536	2,076	24,378	3,420	41,809	7,743
1994			4,943	1,051	47,248	8,438	52,191	9,489	76,372	13,200
1995	1,215		6,155	1,354	21,823	3,126	29,193	4,480	43,578	10,581
1996	646	9	3,338	629	12,495	2,078	16,479	2,716	34,867	4,890
1997			1,321	172	9,932	1,074	11,253	1,246	19,816	2,320
1998	211	21	388	20	4,105	731	4,704	772	12,964	2,003
1999			375	190	3,261	908	3,636	1,098	10,641	2,013
2000	0		382	124	1,402	266	1,784	390	13,585	2,793
2001			67	13	2,849	641	2,916	654	13,117	3,296
2002			1,279	167	8,806	483	10,085	650	19,646	3,043

-continued-

Table 23.-Page 2 of 2.

Year	Tolovana River		Lower Chatanika River		Minto Flats		Tolovana - Minto Flats Complex ^a		LTMA Total	
	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
Averages										
1983-2001	N/A	N/A	N/A	549	N/A	2,272	N/A	2,890	N/A	6,255
10-Yr Average: 1992-2001	N/A	N/A	2,222	492	12,883	2,064	15,312	2,559	29,123	5,304
5-Yr Average: 1997-2001	N/A	N/A	507	104	4,310	724	4,859	832	14,025	2,485
2002 as % of 5-Year Avg.	N/A	N/A	252%	161%	204%	67%	208%	78%	140%	122%

^a Tolovana and Chatanika rivers, and Minto Flats.

Chatanika River). Where necessary, differentiation and clarification between the groups of waters will be made in the text.

The fisheries at Minto Flats and on the Chatanika River are accessed primarily by boat and float plane. Anglers travel from the Murphy Dome Road down the Chatanika River to Goldstream Creek, then up Goldstream Creek to the Minto Lakes. There is also a boat launch into the Tolovana River at Minto Village, located along the western margin of Minto Flats and accessible from the Elliot Highway. Boaters also travel from Nenana down the Tanana River or from Manley up the Tanana River to enter Minto Flats via the Tolovana River. People from Minto Village travel throughout the flats with boats and snowmachines year-round to fish, hunt, and trap.

The Minto Lakes are a popular pike fishing and waterfowl hunting area, and in addition to those who use boats, there are both guiding services and private pilots that travel to the lakes in floatplanes. Guides and private individuals have cabins on some of the sparse areas of higher ground that are not regularly flooded. The Minto Lakes support the majority of the sport fishery for northern pike within the Tolovana River drainage.

The Tolovana drainage/Minto Flats sport fishery has supported a major proportion of the LTMA northern pike sport fishery for many years (Table 23.). It was primarily a summer fishery until the mid-1980s, when an intensive sport fishery developed on concentrations of northern pike that were overwintering in the Chatanika River just upstream from the mouth of Goldstream Creek. Total harvest for the Tolovana River drainage doubled during 1984 - 1986. Many of the fish harvested were large females. It was felt (and later demonstrated by radiotelemetry studies, most recently by Roach 1998a) that these fish were the spawning stock for the Minto Lakes. After 1987, regulations were implemented closing sport fishing for northern pike at Minto Flats between October 15th and May 31, and the bag limit was reduced from 10 per day to five per day, and only one over 30 inches in length could be retained as part of the bag limit. Estimated catch and harvest (and catch rate) peaked in 1994 with a catch in Minto Flats of 47,248 and a harvest of 8,438. Estimated catch and harvest have declined since. However, estimated effort in Minto Flats has also declined, so that catch rate has not declined excessively (Tables 22 and 23). Although effort is not estimated by target species (fishery), it is felt that the majority of the effort at Minto Flats is directed toward northern pike and that estimates of catch, harvest, and effort for Minto Flats are an acceptable trend index for the pike fishery. Unfortunately, the multi-species nature of the Lower Chatanika River fishery makes it difficult to determine effort directed toward pike. However, estimates of catch and harvest within the Lower Chatanika are germane to considerations of Minto Flats northern pike stock status.

A subsistence fishery for northern pike (and whitefish) occurs near Minto Village and at historically used sites in the eastern portions of Minto Flats (Andrews 1988). Gill nets are used throughout the open-water period and pike are taken through the ice with hook and line. Based on the records of ADF&G Commercial Fish Division, subsistence harvest has ranged from about 800 to 1,500 northern pike during the period 1993 - 1997.

Stock assessments were done at Minto Flats almost annually after 1987, and most recently in 2003. Improvements in methodology produced better abundance estimates over the years (Roach 1998a) The Minto Lakes area is the study area within which stock assessment takes place, and because it receives most of the angler use, is an appropriate index of the impact of sport fishing on the northern pike population. The 1997 estimated abundance of northern pike

over 400 mm (16") in length in the Minto Lakes was about 16,500, and in 2000 about 20,000. Radiotelemetry studies of movement and distribution were done in 1987, 1988, 1993 and 1995 - 1997. In addition to documenting movements and overwintering areas, these studies documented fidelity to specific areas, which verified assumptions used in abundance estimates (Roach 1998a).

Effort declined in Minto Flats after the mid-1990s (Table 24) probably as a result of low water levels limiting river access and deteriorating road access. Catch in Minto Flats declined as a function of reduced effort during the late 1990s (Table 23).

FISHERY MANAGEMENT OBJECTIVES

The Minto Flats Northern Pike Management Plan for sport fisheries adopted by the BOF in 1997 and revised in 2001 (5 AAC 70.044) states that the maximum annual exploitation rate for northern pike in the lower Chatanika River and Goldstream Creek/Minto Lakes area by all users may not exceed 20%. Also, should more than 750 northern pike be harvested in Goldstream Creek between January 1 and breakup, an EO must be implemented reducing the daily bag and possession limit to two pike per day, only one of which can be in excess of 30 inches in total length.

RECENT FISHERY PERFORMANCE (2001 – 2002 SUMMARY AND AVAILABLE INFORMATION FOR 2003)

2001-2002 Summary

Estimated catch in the Tolovana -Minto Flats complex bottomed out in 2000 at about 1,800 and increased to about 3,000 in 2001 (Table 23). Harvest followed suit in 2000 at about 400 and about 650 in 2001. Catch increased to about 10,000 fish in 2002 (208% of the 5-year average), but harvest remained low at 650 (78% of the 5-year average). Both were below the 5-year average (Table 23). Effort in Minto Flats was low (about 1,200 and 1,100 days fished during 2000 – 2001) and increased to about 2,350 in 2002, which 123% of the 5-year average (Table 24). The wetlands complex had been subjected to low river stages and lake water levels for several years due to inconsistent and reduced amounts of precipitation. That situation appeared to reverse itself in 1999, when river stages in the Tanana Basin rose to near normal levels, and the trend continued through 2002.

2003 Update

Abundance of northern pike in the Minto Lakes was estimated in 2003 at about 25,000 fish over 16" (400 mm) in length. The abundance of larger northern pike has increased. Harvest in the winter subsistence fishery in the Chatanika River upstream from Goldstream Creek appeared to increase in 2003. Combined sport and subsistence harvest for 2003 will likely be well below the 20% exploitation threshold for management action.

Water levels were very high in Minto Flats during the summer, creating difficulties during population sampling but undoubtedly benefiting the northern pike.

FISHERY MANAGEMENT ACTIVITIES/RESULTS

Catch rates seem sustainable and exploitation is in compliance with the management plans under the present regulatory regime. No in-season management activities were undertaken during 2001 - 2003.

Table 24.-Estimated angling effort at Minto Flats, 1977-2002.

Year	Angler Days
1977	3,886
1978	3,640
1979	2,709
1980	2,727
1981	2,045
1982	1,791
1983	1,281
1984	1,829
1985	2,011
1986	3,318
1987	1,539
1988	1,564
1989	699
1990	932
1991	1,532
1992	2,401
1993	3,911
1994	6,267
1995	6,260
1996	3,973
1997	3,332
1998	1,414
1999	2,431
2000	1,230
2001	1,118
2002	2,349
Averages	
1983-2001	2,476
10-Yr Average: 1992-2001	3,234
5-Yr Average: 1997-2001	1,905
2002 as % of 5-Year Avg.	123%

BOF ACTIONS

Recent BOF actions are described in the fisheries objectives section. No BOF actions involving Minto Flats are proposed for the January, 2004 BOF meeting.

FISHERY OUTLOOK

Effort may increase if water levels in the rivers of Minto Flats remain at normal or high stages, improving boat access. Higher water in Minto Flats should be beneficial to the northern pike, greatly enlarging spawning and rearing areas and reducing cannibalism.

ONGOING AND RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Catch, harvest, and to a certain extent effort will be monitored through the SWHS. Stock status assessment work will be undertaken every 3 to 5 years, in conjunction with the BOF cycle.

SECTION XII: HARDING LAKE NORTHERN PIKE FISHERY

BACKGROUND AND HISTORICAL PERSPECTIVE

Harding Lake is located in the central Tanana Valley, about four miles southeast from the confluence of the Salcha and Tanana rivers. The Salcha River passes just north of Harding Lake, and the broad, braided floodplain of the Tanana River passes just to the west. The lake is about 35 miles southeast in a straight line and about 45 road miles on the Richardson Highway from Fairbanks. It is the largest, deepest, and most accessible of the four large roadside lakes (Birch, Harding, Chena, and Quartz lakes) in the central Tanana Valley and until Chena Lake was constructed, Harding Lake was the closest large lake to Fairbanks. Harding Lake has been used for all types of aquatic recreational activity over the years, including fishing (Doxey 1991).

Harding Lake is generally circular in shape, except for a prominent point in the middle of the southern shoreline, and is surrounded by forested hills. Surface elevation is about 715 ft, surface area is 2,500 acres, and maximum depth is 144 ft. Water color is transparent green, and the lake is oligotrophic and relatively unproductive (LaPerriere 1975). There is no surface outlet, although water has been observed to flow into wetlands to the north during high water periods. The lake is fed by hillside runoff, a few springs, and two inlets. A small inlet drains the adjacent Little Harding Lake basin. The east inlet (Rogge Creek) drains a larger basin (approx. 6,400 acres) to the east. The channel of Rogge Creek comes to a divide at which the water periodically flows into either Harding Lake or the Salcha River. When the channel shifts such that the water flows toward the Salcha River, the lake volume and level is stable or it declines depending on annual precipitation. When Rogge Creek flows into the lake, the lake volume and level remains stable or rises. When the lake level drops, the majority of the wetlands along the shoreline (principally the northern shoreline) dry up. This happened in the mid-1970s and again in the late 1990s. The dry flats are colonized by terrestrial grasses and deciduous shrubs and trees. This phenomenon and its implications are described and quantitatively assessed in Nakao 1980, Kane et al. 1979, and Doxey 1991. More complete descriptions of the lake are available in those reports.

Harding Lake is very accessible. About 75% of the shoreline is ringed with lakefront cabins which are road-connected to the Richardson Highway. There is a large State campground with a major boat launching area, and several other small public access right-of-ways and private boat

launches. The boat launches become progressively more unusable when the lake level recedes, reducing angler access.

Indigenous fish species are northern pike *Esox lucius*, burbot *Lota lota*, least cisco *C. sardinella*, and slimy sculpins *Cottus cognatus*. Introduced species are lake trout *Salvelinus namaycush* and Arctic char *Salvelinus alpinus*. The lake trout are naturally reproducing and have been augmented by small additions of hatchery fish. Natural reproduction of the Arctic char has not yet been documented and the fishery is entirely sustained by stocked fish.

The northern pike are a high profile game fish in Harding Lake because they are readily caught and their preference for shallow water habitats makes them highly visible to anglers. This is in contrast to the other large predators (burbot, lake trout, and Arctic char), which are available to anglers as lower density populations in deep water. In 1991, pike fishing at Harding Lake was closed between April 1 and May 31, spear fishing was closed, and a 26 inch minimum length limit was imposed.

As northern pike generally increased in popularity as a game fish (Doxey 1991) and anglers became more aware of their presence in Harding Lake, harvests increased through the 1980s (Table 25), then fell dramatically during the early 1990s (in part due to regulatory changes) and declined again after 1995. Catches peaked in 1993 at about 8,500 fish and declined slowly thereafter to about 1,400 in 1998.

Although effort is not estimated by target species (fishery), the majority of the effort at Harding Lake was likely directed toward northern pike. Estimated effort increased through the mid-1980s and ranged around 5,000 angler-days from 1990 to 1994 (Table 26). Effort increased to 6,700 angler days in 1995 and 1996, and then declined thereafter to about 3,400 angler days during 1997 - 1998.

Abundance estimates for northern pike were conducted at Harding Lake annually during the period 1991-1999 except in 1994. Abundance of northern pike over 300 mm in total length increased from about 2,300 in 1991 to about 3,800 in 1993. Estimated abundance increased between 1995 and 1996, from 2,338 to 3,337, but declined to 1,780 in 1997 (Roach 1998c). The abundance estimate for 1998 was about 1,400 fish over 12 inches in length (300 mm FL), which is a decline of about 16% from the estimate of 1997, and a decrease of about 44% from the average of the seven population estimates done between 1990 and 1997 (Roach and McIntyre 1999) and was the smallest since assessment efforts have been done.

In 1998, a risk and sustained-yield analysis was completed as part of the research studies on the Harding Lake northern pike population. The risk analysis assessed the likely ability of various regulatory regimes to maintain the northern pike spawning population at about 1,728 fish, the abundance calculated to produce maximum sustained yield (about 400 fish). The recommendation was to increase the minimum length limit from 26 inches to 30 inches (Roach and McIntyre 1999). Plans were made to pursue this recommendation at the December 2000 BOF meeting.

Estimated catch (828) and harvest (38) of northern pike in Harding Lake during 1999 was the lowest recorded. An abundance and age composition estimate revealed that the population of northern pike over 12" (300 mm fork length) had declined to 583 fish and that a recruitment failure was occurring (Scanlon and Roach 2000). Only about 11% of the population consisted of young fish between age-1 and age-6. These diminished cohorts (ages 2-5) are the recruitment

Table 25.-Sport catch and harvest of northern pike in Harding Lake and in the LTMA, 1983-2002.

Year	Harding Lake		LTMA Total	
	Catch	Harvest	Catch	Harvest
1983	N/A ^a	178	N/A	7,898
1984	N/A	766	N/A	6,357
1985	N/A	503	N/A	8,224
1986	N/A	673	N/A	8,112
1987	N/A	1,886	N/A	6,105
1988	N/A	2,092	N/A	7,599
1989	N/A	1,764	N/A	8,310
1990	3,629	591	23,964	5,414
1991	5,071	1,888	23,037	9,426
1992	3,400	341	24,477	4,200
1993	8,471	391	41,809	7,743
1994	5,559	539	76,372	13,200
1995	3,852	502	43,578	10,581
1996	4,070	363	34,867	4,890
1997	1,665	62	19,816	2,320
1998	1,425	139	12,964	2,003
1999 ^b	828	38	10,641	2,013
2000 ^b	396	24	13,585	2,793
2001 ^b	356	0	13,117	3,296
2002 ^b			19,646	3,043
Averages				
1983-2001	-	-	N/A	6,255
10-Yr Average: 1992-2001	-	-	29,123	5,304
5-Yr Average: 1997-2001	-	-	14,025	2,485
2002 as % of 5-Year Avg.	0%	0%	140%	122%

^a NA = data not available.^b Northern pike fishing was closed in Harding Lake in 1999.

Table 26.-Estimated angling effort at Harding Lake, 1983-2002.

Year	Angler Days
1983	708
1984	1,707
1985	850
1986	2,064
1987	5,125
1988	3,256
1989	4,935
1990	3,895
1991	5,155
1992	5,068
1993	4,885
1994	4,913
1995	6,743
1996	6,734
1997	3,383
1998	3,410
1999	2,973
2000	2,538
2001	1,038
2002	2,094
Averages	
1983-2001	3,652
10-Yr Average: 1992-2001	4,169
5-Yr Average: 1997-2001	2,668
2002 as % of 5-Year Avg.	78%

from strong parent classes (1993 - 1997) when adult northern pike were abundant in the lake. The loss of most of the high-quality spawning and rearing habitat as the lake level dropped in the mid-to late 1990s caused the recruitment failures. Scanlon and Roach allude to descriptions in fisheries literature of the importance to survival of young of year northern pike of vegetated zones like those that have disappeared in Harding Lake. Young pike prefer warm, shallow, productive, and sheltered areas. Cannibalism is a major mortality factor acting upon alevins and fingerlings when cover is not available.

On May 1, 2000 an EO was issued closing northern pike fishing in Harding Lake until further notice. This EO was rescinded after the BOF (in January 2001) adopted a proposal indefinitely closing northern pike fishing in Harding Lake.

FISHERY MANAGEMENT OBJECTIVES

A management plan has been written structuring the fishing restrictions and management regime for Harding Lake northern pike to allow restoration of angling opportunity if the population recovers sufficiently (Doxey 2003). The department will initially plan for catch-and-release fishing after abundance increases to a level at which the population can withstand catch-and-release mortality without significant slowing of growth rate. As the population of mature fish exceeds 1,700 fish harvest of northern pike greater than 30" in length will be allowed. If abundance and composition indicators will permit, further liberalizations of harvest will follow.

RECENT FISHERY PERFORMANCE (2000 – 2003)

Northern pike fishing has ended at Harding Lake, eliminating the only major roadside northern pike fishery in Region III. This fishery had produced catches up to about 8,500 fish and harvests up to about 2,100 fish (Table 25). While continual catches and harvests at this level were not sustainable, they are indicative of angler interest in this fishery. Effort declined by over 50% after the closure (Table 26), and then increased, likely as a result of the fishery for stocked Arctic char.

FISHERY MANAGEMENT ACTIVITIES/RESULTS

The declining population of adult northern pike in Harding Lake is indicative of a situation that is presently not controllable while any harvest occurs. The closure has effectively ended most legal fishing mortality for northern pike at Harding Lake, since the other game fish in Harding Lake are deepwater species in summer, when most of the angler effort occurs. Lake trout, burbot, and Arctic char are segregated from northern pike by habitat preference, and anglers targeting them seldom hook northern pike. Anglers have been alerted to the fact that fishing in the shallows of Harding Lake in the summer will not result in the taking of the deepwater species, and that hooking a northern pike in the shallows is evidence of an attempt to take pike, a violation under the closure. Observation of anglers at Harding Lake during summers of 2000 - 2003 indicated good, but not perfect compliance. Winter fishing for Arctic char is increasing, and there may be a small incidental catch of northern pike.

Progress is slowly occurring on planning for a public works project to control Rogge Creek and cause rising lake water levels. Funding has been developed. The department is providing information and expertise in support of this project, and has tentatively agreed to operate it when it is completed.

BOF ACTIONS

The BOF closed northern pike fishing in Harding Lake in January 2001. There was no expiration date to the closure.

FISHERY OUTLOOK

Until the lake level rises and the dry flats along the north end of Harding Lake are recolonized by emergent aquatic vegetation, the outlook is dismal. Should the aquatic habitat be restored, northern pike abundance should increase rapidly as a low-density population takes advantage of large areas of unused habitat. Cannibalism, other predation, and competition for food and cover will be minimal. It will likely be at least 5 years after a recovery begins before catch-and-release fishing can resume.

ONGOING AND RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Enforcement of the closure on northern pike fishing will be encouraged.

The Management Plan with thresholds for restoration of angling opportunity has been written and adopted.

No abundance estimates or other invasive research activities will be undertaken until it appears that the northern pike population is increasing. Because northern pike inhabit shallow, accessible areas, the beginnings of a population recovery will be discernible by visual observation. After this recovery has begun, population monitoring will be undertaken, and the plan will be implemented as appropriate.

The department will support habitat restoration projects at Harding Lake.

If a significant restoration of habitat occurs, the department will undertake enhancement of the northern pike population by attempting to find donor stocks in the Tanana Valley from which adults can be transferred to Harding Lake to augment the spawning population.

SECTION XIII: OTHER NORTHERN PIKE FISHERIES

BACKGROUND AND HISTORICAL PERSPECTIVE

Pike are common in many smaller lakes and in sloughs and tributaries of the Tanana River, and small harvests are reported annually from many locations throughout the LTMA. The lower Chena, Zitziana, and Salcha rivers, Piledriver Slough, and gravel pits in south Fairbanks and on Eielson Air Force Base are examples of the types of areas that produce northern pike for anglers. Other fisheries occur in lakes in the Kantishna River drainage (such as East Twin and Mucha) and in clear boat-accessible sloughs, backwaters, and small tributaries off of the Tanana River. Fish Creek, a small drainage downriver on the Tanana River from Manley, produced a pike that held the state record for many years. The northern pike present in the river system and in waters connected to the river provide the population reservoir which, through the movements of individual fish, ensures the continued viability of small stocks and availability of fishing opportunity wherever suitable habitat occurs. This includes the colonization of ponds. Northern pike colonize suitable gravel pits and other ponds either when the river floods them or the pits are connected to the river, or when people illegally introduce northern pike into those waters. Many of these areas are road-accessible. None of these produce large numbers of fish or very many large fish, but collectively they provide about one-third of the catch and about one-half of the harvest of northern pike in the LTMA (Table 27). Catch and harvest have stabilized. It is

Table 27.-Sport catch and harvest of northern pike in the LTMA waters other than Minto Flats and Harding Lake, and LTMA totals, 1983-2002.

Year	Other Lakes and Streams		LTMA Total	
	Catch	Harvest	Catch	Harvest
1983	N/A ^a	4,259	N/A	7,898
1984	N/A	2,463	N/A	6,357
1985	N/A	2,465	N/A	8,224
1986	N/A	951	N/A	8,112
1987	N/A	1,818	N/A	6,105
1988	N/A	3,542	N/A	7,599
1989	N/A	3,950	N/A	8,310
1990	14,275	2,814	23,964	5,414
1991	11,855	4,952	23,037	9,426
1992	14,492	2,534	24,477	4,200
1993	8,960	3,932	41,809	7,743
1994	18,622	3,172	76,372	13,200
1995	10,533	5,599	43,578	10,581
1996	14,318	1,811	34,867	4,890
1997	6,898	1,012	19,816	2,320
1998	6,835	1,092	12,964	2,003
1999	6,177	877	10,641	2,013
2000	11,405	2,379	13,585	2,793
2001	9,845	2,642	13,117	3,296
2002	9,503	2,393	19,646	3,043
Averages				
1983-2001	N/A	2,667	N/A	6,255
10-Yr Average: 1992-2001	10,809	2,505	29,123	5,304
5-Yr Average: 1997-2001	8,232	1,600	14,025	2,485
2002 as % of 5-Year Avg.	115%	150%	140%	122%

^a NA = data not available.

not presently possible to develop a direct estimate of effort because of the mixed stock fisheries of which these pike fisheries are a part. However, effort might be inferred from catch from a better documented fishery. It is safe to assume that the large majority of effort at Minto Flats is directed toward northern pike. Five-year average effort in Minto Flats is 1,905 angler days (Table 24). Five-year average catch rate for northern pike in Minto Flats is 2.2 fish per day (Tables 23 and 24). It is also safe to assume that the collective catch rate (fish per angler day) for northern pike in the small LTMA fisheries is no better than that of Minto Flats. The 5-year average annual catch for these small fisheries is 8,232 pike. That catch divided by the best possible catch rate (Minto Flats) indicates an annual average effort of about 3,700 angler-days. The catch rate for the small fisheries is likely much less than that of Minto Flats, so the estimate of 3,700 days is a minimum. The wide range of accessibility for anglers, and the diversity of types of angling opportunity (from that available at roadside picnic or swimming spots to waters only accessible by boat or airplane) add value to these fisheries. Angler interest in road accessible northern pike fisheries is high. However, the nature of northern pike as a voraciously piscivorous top-level predator that takes the hook readily but requires many years to grow to the larger sizes valued by anglers makes it difficult to manage for high quality pike fisheries in roadside situations.

Abundance and age and sex composition studies were conducted in East Twin Lake in 1993 (Pearse 1994) and Deadman Lake in 1994 (Hansen and Pearse 1995). In both cases the populations were judged to be healthy and capable of sustaining existing harvest levels. A radiotelemetry study done in 1993 and 1994 in the Chena River indicated that adult northern pike in that river move little during the year, although difficulties with some aspects of the studies caused the results to be somewhat qualified (Pearse 1994).

FISHERY MANAGEMENT OBJECTIVES

Management on a sustainable basis is an overriding obligation. However, in roadside ponds stocked with salmonids such as rainbow trout, where northern pike have been illegally introduced, and maximum harvest rate (in excess of sustainability) is beneficial.

RECENT FISHERY PERFORMANCE (2001 – 2002 SUMMARY AND AVAILABLE INFORMATION FOR 2003)

2001-2002 Summary

Catch and harvest stabilized. In 2003 catch (about 9,500) was 115% of the 5-year average and harvest (2,400) was 150% of the 5-year average.

2003 Update

There is no information available for 2003.

FISHERY MANAGEMENT ACTIVITIES/RESULTS

In 1992, northern pike fishing in lakes of the Tanana drainage was closed during all of April and May to protect pike just prior, during, and immediately after spawning. This closure was subsequently judged to be unnecessarily restrictive, and in 1997 the BOF adopted a revision leaving all lakes in the LTMA, except Harding Lake, open until April 20, and then closed until June 1.

BOF ACTIONS

There have been no BOF actions resulting in changed regulations for since 1997. The majority of these fisheries are subject to the background regulations for northern pike in the Tanana drainage.

FISHERY OUTLOOK

Angler interest in opportunities to utilize the small roadside fisheries remains high, and the pike stocks in waters not connected to the river will not meet the demand. Northern pike in road accessible waters connected to the river system will continue to provide a steady but relatively low level of opportunity. Northern pike populations in remote waters will continue to provide higher-quality opportunities for the foreseeable future.

ONGOING AND RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Catch, harvest, and to a certain extent effort will be monitored through the SWHS. Assessment work on remote fisheries should be undertaken.

SECTION XIV: LTMA BURBOT FISHERY

BACKGROUND AND HISTORICAL PERSPECTIVE

Burbot are found in suitable habitat throughout the Yukon River drainage in Alaska (and throughout the rest of the State except in Southeast Alaska). The Tanana River is the mainstem glacial river that drains the Tanana Valley and is a major tributary of the Yukon River. It is utilized by burbot during all phases of their life history. The Tanana River and adjacent lowlands are also utilized by humans as a transportation corridor during both winter and summer. Within the LTMA the Tanana River is accessible from many communities, long stretches of the road system, and tributary streams and rivers with adjacent communities and road systems. LTMA communities to which the Tanana River is very important include Salcha, North Pole, Fairbanks, Nenana, and Manley.

Within the LTMA burbot occur in the Tanana River and lower sections of clear tributaries such as the Chena, Lower Chatanika, Salcha, and Tolovana rivers, and in deeper lakes such as Harding Lake and West Twin Lake. They can also colonize suitable ponds and gravel pits when flooding from a nearby river occurs. Burbot are a member of the cod family (*Gadidae*), and are valued by LTMA residents for the quality of their flesh. Fishing occurs year-round, but the majority of the effort in the LTMA appears to occur in fall and winter. The most common gear type in flowing waters of the drainage is set lines, on which up to 15 hooks may be used, but hand held gear is used by anglers in lakes and to a certain extent in rivers. Burbot stocks in the Tanana River system are harvested most heavily near population centers such as Fairbanks, North Pole, and Nenana. Population assessments were conducted annually from the late 1980s through 1998 in the Lower Chena River and the Tanana River near Fairbanks, where the most intensive river fishery occurs. Radiotelemetry studies have also been conducted. Extensive movements and exchange of burbot within the Tanana River drainage tends to minimize effects of concentrated local fishing effort, and overall stocks in the Tanana River appear to be lightly exploited (Evenson 1997). For the purposes of apportioning the effort, catch and harvest estimate for the area described in the SWHS reports as the Middle Tanana River (mainstem Tanana from Delta Junction to Nenana) into the UTMA and LTMA (dividing the Tanana at the

confluence with the Little Delta River), one third of the effort, catch, and harvest for the Middle Tanana is allocated to the UTMA, and two thirds to the LTMA.

Although exploitation rates of burbot in the Tanana River are not considered excessive, studies suggest low abundance in most of the easily accessible lakes examined within the Tanana drainage. Population density of burbot in many lakes declined dramatically in the early 1980s due to unsustainable rates of sport fishing exploitation. More recent stock assessment studies conducted in lakes of the Tanana River drainage demonstrate the detrimental effects of long-term high exploitation rates on stocks (Parker 1998). Stock assessments in (easily accessible) Harding Lake (Lafferty et al. 1992) have precipitated regulatory restrictions. Set lines may not be used in Harding Lake, and in other lakes in the LTMA where set lines are allowed, they may only be used in winter. Bag and possession limit in Harding Lake is two fish.

While most of the effort in the Tanana River fishery is probably directed toward burbot, it can be difficult to make inferences about effort in the burbot fisheries because the fisheries are mixed-species fisheries. Also, the variable fishing power of the allowable gear-types for burbot confound inferences of effort based on estimated catch. The SWHS bases its estimates on calendar years, which divide the winter fishery into two segments and assigns the first portion to the end of 1 year and the second portion to the beginning of the next. The impact of early winter weather conditions, timing of freeze-up, etc on effort are thus combined with those in the second part of the previous winter fishery. Anglers fish for burbot all winter, and casual observations indicate that effort increases as the ice becomes safer to travel on in November, declines in late December, and climbs again after mid-January. This decline coincides with the darkest, coldest time of the year, and with the general timing of burbot spawning in the rivers.

Comparison of LTMA catch and harvest estimates with the SWHS estimates indicates that the LTMA burbot fishery has been providing about 25% of the statewide burbot catch and harvest annually and about 40% in 2002,. The estimated catch of burbot in the LTMA varies from year to year within a range of about 2,000 to 4,000. The 5-year average harvest is 70% of the catch (Table 8), which is higher than any other fishery in the Tanana drainage, indicating the value of this fishery food for Interior residents. The Tanana River and the Lower Chena River fisheries provide most of the catch and harvest in the LTMA. These fisheries are on the same stock of burbot, which could be characterized as a "middle Tanana" stock.

FISHERY MANAGEMENT OBJECTIVES

The management objective for the Tanana River and LTMA lakes is to ensure that harvests and incidental mortality of burbot are sustainable. Healthy stocks such as the Tanana River burbot are managed to permit maximum sustained yield while depressed stocks, such as in road accessible lakes, are managed to allow the stocks to rebuild.

RECENT FISHERY PERFORMANCE (2001 – 2002 SUMMARY AND AVAILABLE INFORMATION FOR 2003)

2001-2002 Summary

Catch and harvest in 2002 were above the LTMA 5-year (1997-2001) average, but within the range of values for that period (Table 28). The fishery appears to be stable. Retention rate (caught and kept) was 83%, well above the 5-year average of 70%, and was above the range of values for that period (Table 8). In a fishery with a species valued primarily as food, the higher retention rate may be an indicator of a high proportion of larger fish in the burbot population.

Table 28.-Sport harvest and catch of burbot in the LTMA, 1983-2002.

Year	Harding Lake		Chena River		Tolovana River & Minto Flats		Chatanika River		Piledriver Slough	
	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1983	N/A ^a	157	N/A	1,055	N/A	0	N/A	21	N/A	84
1984	N/A	428	N/A	1,233	N/A	39	N/A	13	N/A	0
1985	N/A	0	N/A	2,065	N/A	105	N/A	175	N/A	70
1986	N/A	0	N/A	884	N/A	433	N/A	40	N/A	0
1987	N/A	53	N/A	149	N/A	132	N/A	13	N/A	79
1988	N/A	73	N/A	386	N/A	0	N/A	55	N/A	55
1989	N/A	10	N/A	1,322	N/A	20	N/A	10	N/A	100
1990	17	17	338	304	0	0	17	17	456	456
1991	45	45	609	225	56	56	0	0	237	203
1992	17	17	1,235	1,032	0	0	17	8	203	195
1993	0	0	1,328	1,135	0	0	0	0	760	568
1994	31	31	685	592	218	208	0	0	135	73
1995	46	46	1,045	597	172	161	206	91	500	299
1996	133	80	540	441	18	18	9	9	117	80
1997	52	52	1,018	703	232	52	70	32	155	155
1998	8	0	1,144	854	17	0	0	0	143	135
1999	139	38	657	350	0	0	0	0	279	127
2000	73	73	1,236	702	48	48	0	0	73	73
2001	22	14	281	230	0	0	7	7	0	0
2002	85	24	83	58	185	172	102	77	438	335
Averages										
1983-2001	N/A	60	N/A	750	N/A	67	N/A	26	N/A	143
10-Yr Average: 1992-2001	54	38	950	663	76	54	30	14	260	187
5-Yr Average: 1997-2001	59	35	867	568	59	20	15	8	130	91
2002 as % of 5-Year Avg.	145%	68%	10%	10%	311%	860%	662%	987%	337%	370%

-continued-

Table 28.-Page 2 of 2.

Year	Nenana River		Middle and Lower Tanana River		Other Waters		LTMA Total	
	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1983	N/A	N/A	N/A	1,652	N/A	346	N/A	3,315
1984	N/A	N/A	N/A	1,210	N/A	208	N/A	3,131
1985	N/A	N/A	N/A	860	N/A	256	N/A	3,531
1986	N/A	53	N/A	1,236	N/A	431	N/A	3,077
1987	N/A	132	N/A	1,302	N/A	346	N/A	2,206
1988	N/A	0	N/A	1,335	N/A	0	N/A	1,904
1989	N/A	60	N/A	1,301	N/A	140	N/A	2,963
1990	68	68	961	838	844	507	2,701	2,207
1991	11	11	857	683	150	150	1,965	1,373
1992	102	76	1,323	981	75	59	2,972	2,368
1993	21	11	1,814	1,635	241	135	4,164	3,484
1994	0	0	2,063	1,626	21	21	3,153	2,551
1995	0	0	2,120	1,684	229	172	4,318	3,050
1996	44	44	818	537	256	169	1,935	1,378
1997	52	52	3,032	2,437	324	341	4,935	3,824
1998	25	25	1,262	876	233	198	2,832	2,088
1999	0	0	1,521	1,328	599	206	3,195	2,049
2000	182	36	1,442	936	258	2,013	3,312	2,032
2001	0	0	919	508	36	0	1,265	759
2002	155	155	1,632	1,283	395	387	3,371	2,787
Averages								
1983-2001	N/A	36	N/A	1,209	N/A	199	N/A	2,484
10-Yr Average: 1992-2001	44	26	1,625	1,272	213	155	3,252	2,410
5-Yr Average: 1997-2001	52	23	1,635	1,217	290	189	3,108	2,150
2002 as % of 5-Year Avg.	299%	686%	100%	105%	136%	204%	108%	130%

^a NA = data not available.

Anglers don't normally go fishing for burbot with the intent of engaging in catch-and-release recreational fishing. Most of the burbot landed that are considered large enough to be suitable for consumption are harvested.

2003 Update

As in early winter, 2002, scattered angler reports of good fishing in the Tanana River from Fairbanks to Nenana were being relayed to the Area Management Biologist during December 2003. There was an increase in catch and harvest in 2002 that seemed to correspond to the reports.

FISHERY MANAGEMENT ACTIVITIES/RESULTS

The restrictive regulations (possibly combined with low abundance) in Harding Lake have kept harvest low there.

The bag and possession limit of 15 fish in rivers seems to be allowing the stock to sustain itself at the current level of fishing effort.

BOF ACTIONS

No regulatory matters were brought before the Board of Fish during the 2001 cycle. There will be no regulatory activity directed toward burbot at the January 2004 BOF meeting.

FISHERY OUTLOOK

The fishery should remain stable. Increased participation would increase harvest, but angler interest in this fishery appears to be steady.

ONGOING AND RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Catch, harvest, and to a certain extent effort will be monitored through the SWHS. Assessment efforts are being reduced. Should trend information develop that indicates that the fishery is changing; assessment should be reinstated to evaluate stock status.

SECTION XV: CHATANIKA RIVER WHITEFISH FISHERY

BACKGROUND AND HISTORICAL PERSPECTIVE

During late summer and fall, humpback whitefish and least cisco migrate up the Chatanika River to spawn in the middle section of the river between Hard Luck Creek and a few miles upstream of the Elliot Highway Bridge. They then move downriver to as yet undefined overwintering areas. It's quite possible that some of overwintering areas are outside of the Minto Flats complex. Fleming (1999) describes the potential compound life history of the stocks, which might include long migrations in the Tanana and Yukon rivers. During the course of northern pike research, humpback whitefish and least ciscos have been observed moving into the Minto Lakes immediately after breakup. They likely feed for a period of time during the summer before moving on to spawning areas.

The only major sport fishery for whitefish in the LTMA was the spear fishery on the Chatanika River in the vicinity of the Elliot Highway Bridge. This fishery took place in September, while least cisco and humpback whitefish were migrating upstream to spawn. Both of these species were harvested, as were a small percentage of round whitefish. Harvests during the late 1970s

Table 29.-Sport catch and harvest of whitefish in the Chatanika River and the LTMA, 1977-2002.

Year	Chatanika River		LTMA Total	
	Catch	Harvest	Catch	Harvest
1983	N/A ^a	5,895	N/A	7,436
1984	N/A	9,268	N/A	10,472
1985	N/A	14,350	N/A	18,480
1986	N/A	22,038	N/A	26,995
1987	N/A	25,074	N/A	25,937
1988	N/A	7,983	N/A	9,123
1989	N/A	15,542	N/A	16,688
1990	5,334	5,216	8,014	6,299
1991	23	0	619	356
1992	2,033	2,033	3,140	2,810
1993	558	558	948	722
1994	436	97	1,677	242
1995	71	9	1,187	578
1996	320	46	660	149
1997	95	24	1,404	773
1998	60	0	1,115	490
1999	14	0	976	219
2000	361	0	847	313
2001	245	0	883	221
2002	126	63	1,247	936
Averages				
1983-2001	N/A	542	N/A	6,753
10-Yr Average: 1992-2001	302	96	1,077	412
5-Yr Average: 1997-2001	348	120	1,045	403
2002 as % of 5-Year Avg.	36%	53%	119%	232%

^a NA = data not available.

were generally under 5,000 fish, but the fishery became very popular during the 1980s, and harvests had increased to 25,000 by 1987 (Table 29).

This fishery had no bag limit until 1988, when a 15 fish per day limit was implemented. Harvest decreased in 1988 after the bag limit was imposed, but increased again in 1989. Declines in abundance combined with harvest estimates that were considered unsustainable prompted the department to close the fishery by EO on October 10 of 1990, and again on September 9 of 1991. In February of 1992, the BOF adopted a department proposal to limit the fishery to the month of September, and to limit the area where the fishery took place to downstream of a point one mile above the Elliot Highway Bridge.

During 1992, the department also adopted a management plan that set threshold abundance levels required to allow harvest. The threshold abundance level for humpback whitefish is 10,000 spawners, and the threshold abundance level for least cisco is 40,000 spawners. Stock assessment done in 1992 indicated abundance levels above the threshold levels in the management plan (Table 30), and the fishery was open during 1992, but an extremely early winter resulted in low participation in the fishery that year, and harvest barely exceeded 2,000. Stock assessment in 1993 also indicated abundance levels above the threshold levels allowing harvest, and the fishery remained open, but harvest levels were again very low. The low harvest in 1993 was attributed to heavy rainfall and flooding which persisted during much of the spear fishery, creating high turbid water conditions which made spearing difficult. Stock assessment during 1994 indicated that the abundance level of least cisco was below the management plan threshold allowing harvest, and the fishery was closed by EO on September 5, 1994. The whitefish fishery on the Chatanika River has been closed by EO since that date. Harvest has been minimal. Abundance estimates for whitefish in the Chatanika were not conducted in 1995 or 1996, but estimates of stock composition were obtained in 1996 (Fleming, 1997b) and an abundance estimate was done in 1997 (Fleming, 1997b). Abundance of humpback whitefish increased in 1997 above the levels of 1993 and 1994, but the estimate for least cisco was below estimates for 1993 and 1994, and was almost 70% lower than the 1992 estimate (Table 30). Although the spawning population of humpback whitefish was recovered, and that stock was showing good recruitment of younger age classes, stock composition data showed a continuing decline in the number of 3-year-old least ciscos. Whereas stock assessment between 1992 and 1994 showed three year-old least cisco making up over 30% of the total estimate, 3 year-olds only represented 14% of the 1997 sample, and only 5% of the 1997 abundance estimate. This recruitment failure will result in a weak year class that will slow any stock rebuilding.

Table 30.-Humpback whitefish and least cisco abundance estimates from the Chatanika River, 1992-1997^a.

Assessment Year	Humpback Whitefish	Least Cisco
1992	19,187 fish (SE = 1,617)	75,035 fish (SE = 8,555)
1993	13,112 fish (SE = 1,096)	46,562 fish (SE = 5,971)
1994	12,700 fish (SE = 1,138)	27,639 fish (SE = 3,211)
1995	N/A ^b	NA
1996	NA	NA
1997	16,107 (SE = 1,260)	22,811 (SE = 4,496)

^a Data from Fleming (1997).

^b NA = data not available.

Stock monitoring in late summer of 1998 indicated that the growth of the humpback whitefish spawning stock through recruitment had slowed, and that there were slight improvements in recruitment to the least cisco spawning stock (Fleming 1999). The fishery remained closed. Fleming described possible causes of natural mortality that might be reducing recruitment, including severe winter conditions in spawning areas, sub-optimum hydrological conditions, and predation.

Stock monitoring in late summer of 1999 indicated that recruitment of humpback whitefish was stable, and similar to that observed in 1991 and 1992 (when humpback whitefish were quite abundant; Table 29). However, the proportion of large, old fish had declined somewhat between 1998 and 1999. Recruitment of least ciscos remained poor, with a low proportion of age-2 and age-3 fish (D. Fleming, Sport Fish Biologist, ADF&G, Fairbanks; personal communication). Capture rate of least ciscos was less than half of that of humpback whitefish during stock sampling. Assuming that the abundance of humpback whitefish is fairly stable, this low proportion of least ciscos is a crude indicator that the 4:1 proportion of least cisco to humpback whitefish spawners that would indicate that the least ciscos population might be recovering to a level which can sustain a harvest has not been achieved, and supports the evidence of low recruitment.

Stock monitoring in late summer of 2000 indicated that recruitment of humpback whitefish was improving, and that strong year classes were present as age 9 - 11 fish. Stock composition was similar to that of 1994, when the threshold abundance that could sustain a spear fishery was present in the river.

A high proportion (about 75%) of the least ciscos sampled were age-3 and age-4. These fish are fully recruited to the spawning population. Capture rate of least ciscos (with an electrofishing boat) slightly exceeded that of humpback whitefish (53% of the sample was least ciscos), a crude indicator that greater abundances of ciscos may be present than during 1997 - 1999.

FISHERY MANAGEMENT OBJECTIVES

The whitefish fishery on the Chatanika River is managed under the Chatanika River Sport Fisheries Management Plan written and adopted in 1992. The plan sets threshold abundance levels for both humpback whitefish and least cisco below which no harvest is allowed, and a range of maximum exploitation rates depending on the threshold abundance for that species. The threshold abundance level for humpback whitefish is 10,000 spawners, and the maximum exploitation rate is from 10 to 15%. The threshold abundance level for least cisco is 40,000 spawners, and maximum exploitation rate is from 20% to 25%. As recommended earlier in this report, the Chatanika Plan should be broken into components and whitefish dealt with separately from grayling (and other species).

RECENT FISHERY PERFORMANCE (2001 – 2002 SUMMARY AND AVAILABLE INFORMATION FOR 2003)

2001-2002 Summary

The sport fishery allowing humpback whitefish to be taken by hook-and-line was legalized by the BOF in January, 2001. Low levels of catch and harvest occurred in 2001 and 2002.

2003 Update

No fisheries information is yet available for 2003. Periods of high water and flooding interrupted all angling activity in the Chatanika River.

FISHERY MANAGEMENT ACTIVITIES/RESULTS

Angling opportunity is available for humpback whitefish. The least cisco stocks are being allowed to rebuild.

BOF ACTIONS

There are no proposals or BOF regulatory activity on line for Chatanika River whitefish at the January 2004 BOF meeting.

FISHERY OUTLOOK

Whether catch and harvest increases under the present regulatory regime (allowing harvest of humpback whitefish with hook and line) remains to be seen. It generally takes a period of years for such a fishery to develop.

ONGOING AND RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Complete stock assessment of whitefish has not been done on the Chatanika River since 1997. The most recent stock composition sample was collected during 2000. Research on whitefish stocks in the Chatanika River should be limited to estimating stock composition until there are indications that stocks may be rebuilding and an abundance estimate is needed to confirm the recovery. Stock composition should be sampled in 2004. A review of thresholds triggering a legal spearfishery should be undertaken. Currently spears and arrows may not be used to take whitefish in the Chatanika River by regulation. It may be advisable to re-structure the regulation so that F&G has EO authority to open and close the taking of whitefish with spears and arrows.

SECTION XVI: OTHER WHITEFISH FISHERIES

BACKGROUND AND HISTORICAL PERSPECTIVE

Besides the Chatanika River, harvests and catches of whitefish from the LTMA that are consistently reported in the SWHS come from the Chena, Salcha, and Tanana rivers. These fisheries may involve hook-and-line angling and some spearing of fish migrating to spawning grounds in the fall. Round whitefish share a common habitat preference with grayling and are abundant in many areas where anglers fish for grayling. They are occasionally taken with rod and reel, as are humpback whitefish. Least ciscos rarely take a hook. Of the fisheries other than the Chatanika River, the Chena and Tanana rivers have accounted for the largest harvests. Harvest after the late 1980s in the Chena River declined sharply when the use of bait on small hooks was prohibited as part of a regulatory package protecting Arctic grayling. Given their wide distribution and low catch rate, whitefish are judged to be an underutilized resource at this time.

Although it has been felt in the past that there was very little hook-and-line angling for whitefish in the LTMA, and that most harvests and effort involved spear fisheries, estimated catches in many cases are much higher than estimated harvests (Table 31). This clearly indicates that a substantial portion of the catch is caught with hook-and-line, and is subsequently released. These data also indicate that although the fishery for whitefish on the Chatanika River was

almost entirely a spear fishery, catches at many other locations were probably from hook-and-line fisheries. LTMA whitefish catch and harvest are indicative of a low-level fishery.

FISHERY MANAGEMENT OBJECTIVES

The background management objective for the LTMA whitefish outside of the Chatanika River is to ensure that harvests are sustainable.

RECENT FISHERY PERFORMANCE (2001 – 2002 SUMMARY AND AVAILABLE INFORMATION FOR 2003)

2001 - 2002 Summary

Both catch and harvest in 2002 were greater than in 2001, above the 1997 - 2001 5-year average, and above the range of values for that period.

2003 Update

No information has surfaced for 2003.

FISHERY MANAGEMENT ACTIVITIES/RESULTS

Anglers are encouraged to fish for whitefish and to look for other stocks that might provide opportunity for fall spear fishing. Because of ongoing interest, it is possible that new spear fisheries may emerge on small stocks of whitefish in some of the clearwater tributaries of the Tanana River, and reported harvest levels should be watched in future years, especially from those streams that are easily accessible.

To date there has been little success at developing spear fisheries on other stocks.

Table 31.-Sport catch and harvest of whitefish in the LTMA, 1977-2002.

Year	Chena River		Chatanika River		Salcha River		Tanana River		Other Locations		LTMA Total	
	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1983	N/A ^a	1,064	N/A	5,895	N/A	94	N/A	13	N/A	370	N/A	7,436
1984	N/A	883	N/A	9,268	N/A	117	N/A	33	N/A	171	N/A	10,472
1985	N/A	3,780	N/A	14,350	N/A	35	N/A	0	N/A	315	N/A	18,480
1986	N/A	1,954	N/A	22,038	N/A	783	N/A	801	N/A	1,419	N/A	26,995
1987	N/A	56	N/A	25,074	N/A	277	N/A	128	N/A	402	N/A	25,937
1988	N/A	790	N/A	7,983	N/A	0	N/A	41	N/A	309	N/A	9,123
1989	N/A	603	N/A	15,542	N/A	362	N/A	28	N/A	153	N/A	16,688
1990	287	136	5,334	5,216	68	68	112	0	2,213	879	8,014	6,299
1991	137	34	23	0	0	0	26	26	433	296	619	356
1992	212	129	2,033	2,033	28	0	276	261	591	387	3,140	2,810
1993	148	96	558	558	17	9	31	0	194	59	948	722
1994	249	0	436	97	58	19	90	29	844	97	1,677	242
1995	436	155	71	9	54	0	12	12	614	402	1,187	578
1996	150	18	320	46	35	0	0	0	155	85	660	149
1997	425	325	95	24	331	240	68	68	485	116	1,404	773
1998	425	83	60	0	8	8	13	13	609	386	1,115	490
1999	311	41	14	0	75	27	5	5	571	146	976	219

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Table 31.-Page 2 of 2.

Year	Chena River		Chatanika River		Salcha River		Tanana River		Other Locations		LTMA Total	
	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
2000	176	59	361	0	21	17	0	0	289	237	847	313
2001	402	91	245	0	26	0	74	74	136	56	883	221
2002	126	63	126	63	7	0	28	0	905	845	1,247	936
Averages												
1983-2001	N/A	542	N/A	542	N/A	108	N/A	81	N/A	331	N/A	6,753
10-Yr Average: 1992-2001	302	96	302	96	69	36	33	22	433	176	1,077	412
5-Yr Average: 1997-2001	348	120	348	120	92	58	32	32	418	188	1,045	403
2002 as % of 5-Year Avg.	36%	53%	36%	53%	8%	0%	88%	0%	216%	449%	119%	232%

^a NA = data not available.

BOF ACTIONS

There will be no regulatory activity directed toward whitefish at the January, 2004 BOF meeting.

FISHERY OUTLOOK

The fishery should remain stable. Increased participation would increase harvest, but angler interest in this fishery appears to be steady. There remains a segment of the angling public who desire to participate in a spear fishery for whitefish in the Tanana drainage. The department receives inquiries each fall as to whether or not the Chatanika will open to spearing that year. Because of this ongoing interest, it is possible that new spear fisheries may emerge targeting small stocks of whitefish in some of the clearwater tributaries of the Tanana River, and reported harvest levels should be monitored in future years, especially from those streams that are easily accessible.

ONGOING AND RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Catch, harvest, and to a certain extent effort will be monitored through the SWHS. Assessment efforts are being reduced. Should trend information develop that indicates that the fishery is changing, assessment should be reinstated to evaluate stock status.

Whitefish are highly migratory. In the Tanana and Yukon rivers there are subsistence and personal use fisheries. There is little information available describing the relationship between whitefish stocks available to and utilized by LTMA anglers/spear fishermen and those utilized within other fisheries. Research projects should be developed and implemented to delineate the life history patterns of Tanana drainage whitefish.

SECTION XVII: STOCKED WATERS FISHERIES

BACKGROUND AND HISTORICAL PERSPECTIVE

This section briefly describes the harvest and effort trends and issues for LTMA stocked waters. The Region III stocked waters staff produces detailed Annual Management Reports describing the stocking program from a perspective of both Region III and by Management Area. The forthcoming report will complement this Area Management Report with sections describing the history and results of the stocking program within the LTMA (Skaugstad 2001). Effort estimates for stocked waters in this section are from that report.

The program of stocking hatchery produced fish to augment angling opportunity in Alaska began in 1952 when lakes along the road system near Fairbanks were stocked with rainbow trout and coho salmon. The first sport fish hatchery in Alaska (then the Territory of Alaska) was constructed at Birch Lake in 1952 and remained in operation until the 1960s. Subsequently hatcheries at Fire Lake, Ft. Richardson, Elmendorf AFB, Clear Air Force Station, and other locations supplied fish to LTMA waters. Presently the Ft. Richardson and Elmendorf hatcheries are in operation and supply the stocked production for Interior Alaska.

The hatcheries presently produce rainbow trout, Chinook and coho salmon, Arctic grayling, and Arctic char for stocking into LTMA waters. Due to hatchery cutbacks lake trout have been eliminated and some size classes of the other species have been reduced in availability, are only available at smaller sizes, or have been eliminated altogether. Experimental groups of sheefish and Chinook - coho hybrids have been produced and stocked into LTMA waters, and sockeye

salmon from the Gulkana Hatchery were stocked into Harding Lake for 2 years. Those species were found to be cost-ineffective and production was discontinued.

At present a total of 54 lakes are stocked in the LTMA. They range in size from Harding Lake at about 2,500 acres to small urban ponds less than one acre in surface area. Piledriver Slough is the only stream stocked, with (sterile) rainbow trout. The stocked waters offer opportunities ranging from neighborhood urban ponds and large and small roadside lakes through remote lakes that are only trail-accessible, sometimes only in winter, to a few remote lakes only accessible by airplane. Within the spectrum of fisheries management needs within the LTMA they function to provide additional and more diverse angling opportunity and to shift pressure from and provide harvest alternatives for wild stocks. Perhaps one of the most important aspects of the diversity provided is the major, sustainable opportunity for winter fishing.

Fish have been stocked at four sizes: fingerling (2 grams), subcatchables (20 - 60 grams), catchables (100 - 200 grams) and surplus broodstock (rainbow trout only, up to 1,500 grams). Size at stocking depends on management needs for the particular stocking location and hatchery production capability. For example, catchables are stocked in roadside and urban ponds because the angler use of such places produces demand far in excess of the production capacity of the pond to sustain the fishery with fingerling stockings. Conversely, fingerlings are stocked into remote lakes because those lakes have the productivity to meet the lower demand and it is too expensive to transport larger fish with aircraft.

Catch and harvest for the period 1990-2002 are detailed in Table 32. Stocked species provide a consistently high proportion of the total LTMA catch and harvest (Tables 4a, 4b, 4c, 5, 6 and 7). Catch averaged 41% of the LTMA total catch during 1997 - 2001, and harvest for the same period averaged 72% of the LTMA total harvest. It is important to note that both catch and harvest appear to be impacted by the size of the fish at stocking. If the hatchery goals for size are met or exceeded for catchables, more anglers are attracted to fish for the larger fish, driving catch up, and a higher proportion are harvested than if the fish are small. Similarly, when fingerlings are stocked at or larger than the target size, survival to catchable size will generally be better, resulting in better fishing. Conversely, undersized fingerlings exhibit lower survival.

Effort upon stocked waters ranged from 31% to 41% of the LTMA total effort during the period 1990 - 1999 (Table 33).

FISHERY MANAGEMENT OBJECTIVES

Fishery Management objectives are set out in the 2003 Statewide Stocking Plan for Recreational Fisheries, and are addressed in the report in preparation by the Region III stocked waters staff.

RECENT FISHERY PERFORMANCE (2001 – 2002 SUMMARY AND AVAILABLE INFORMATION FOR 2003)

2001-2002 Summary

Stocked fisheries performed well in aggregate during 2001-2002. Catch and harvest during 2002 exceeded the 1997-2001 5-year average (Table 32) and stocked waters provided 80% of the

Table 32.-Sport catch and harvest of stocked fish in the LTMA waters and totals for all species, 1990-2002.

Year	Landlocked Salmon		Rainbow Trout		Arctic Char		Lake Trout		Grayling	
	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1990	16,951	6,566	90,248	35,377	1,267	440	321	102	5,131	929
1991	16,417	10,604	82,345	40,039	2,120	494	289	229	5,767	1,522
1992	15,424	6,836	57,907	20,164	4,588	1,311	1,797	363	6,041	700
1993	9,952	5,976	82,695	27,976	6,704	2,608	770	173	10,509	1,657
1994	10,242	3,645	53,518	17,014	2,642	1,068	332	73	20,674	2,665
1995	10,140	3,497	59,254	18,743	4,671	1,382	381	212	9,936	920
1996	13,682	5,094	115,218	34,382	5,398	1,697	1,200	246	12,460	617
1997	11,967	3,701	68,025	21,516	5,370	1,665	785	215	10,948	743
1998	18,005	4,867	63,327	19,200	4,925	2,298	416	51	15,070	1,325
1999	10,025	2,590	79,297	27,067	6,914	2,505	1,071	343	10,533	1,681
2000	20,655	6,266	94,929	30,016	5,612	2,262	534	73	12,920	1,161
2001	12,719	5,085	37,391	11,811	4,556	1,039	683	161	8,285	1,149
2002	30,953	14,258	69,374	29,609	8,494	4,303	628	48	15,060	5,392
Averages										
10-Yr Average: 1992-2001	13,281	4,756	71,156	22,789	5,138	1,784	797	191	11,738	1,262
5-Yr Average: 1997-2001	14,674	4,502	68,594	21,922	5,475	1,954	698	169	11,551	1,212
2002 as % of 5-Year Avg.	211%	323%	101%	135%	155%	220%	90%	28%	130%	445%

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Table 32.-Page 2 of 2.

Year	All Stocked Species		LTMA Total		Stocked as a % of LTMA Total	
	Catch	Harvest	Catch	Harvest	Catch	Harvest
1990	113,918	43,414	269,361	75,186	42%	58%
1991	106,938	52,888	229,970	83,237	47%	64%
1992	85,757	29,374	192,594	47,466	45%	62%
1993	110,630	38,390	282,500	63,490	39%	60%
1994	87,408	24,465	325,269	52,501	27%	47%
1995	84,382	24,754	239,737	59,741	35%	41%
1996	147,958	42,036	316,837	58,414	47%	72%
1997	97,095	27,840	327,712	45,676	30%	61%
1998	101,743	27,741	287,586	37,789	35%	73%
1999	107,840	34,186	276,123	45,216	39%	76%
2000	134,650	39,778	236,191	49,783	57%	80%
2001	63,634	19,245	147,597	26,587	43%	72%
2002	124,509	53,880	259,165	67,326	48%	80%
Averages						
10-Yr Average: 1992-2001	102,110	30,781	263,215	48,666	40%	64%
5-Yr Average: 1997-2001	100,992	29,758	255,042	41,010	41%	72%
2002 as % of 5-Year Avg.	123%	181%	102%	164%	-	-

Table 33.-Estimated angling effort (number of angler-days) expended on stocked waters in the LTMA and LTMA total effort, 1990-2002.

Year	Stocked Waters Effort	LTMA Total Effort	Stocked Waters Effort as a % of Total LTMA
1990	54,087	133,365	41%
1991	43,895	106,959	41%
1992	32,834	81,378	40%
1993	40,690	103,713	39%
1994	33,113	99,906	33%
1995	44,344	141,231	31%
1996	57,762	159,027	36%
1997	27,565	89,911	31%
1998	27,934	81,789	34%
1999	39,935	114,592	35%
2000	37,153	87,451	42%
2001	25,199	63,702	40%
2002	38,064	78,499	48%
Averages			
10-Yr Average: 1992-2001	40,247	104,591	36%
5-Yr Average: 1997-2001	31,557	87,489	33%
2002 as % of 5-Year Avg.	121%	90%	

LTMA harvest in 2002. Arctic char catch and harvest is trending upward, as these long - lived fish increase in abundance and anglers learn to catch them.

Changes in effort upon stocked waters roughly paralleled total effort changes within the LTMA over the years (Table 33). Effort upon stocked waters in 2002 (about 38,000 days fished) was 121% of the 1997-2001 average.

Reductions in hatchery production as a result of aging facilities, reductions in water availability, and in the amount of hot water available, are reflected in the steady decline of the number of catchable rainbow trout stocked in recent years (Tables 34, 35, 36, and 37). Similarly, Arctic grayling and some cohorts of other species characterized as “catchables” that were stocked during these years were smaller than the standard for catchable fish, confounding evaluation of their performance in the fisheries. A total of 331,083 fish was stocked into LTMA waters in 2002 (Table 37). The largest proportion was fingerlings, and the largest proportion of those was coho salmon.

FISHERY MANAGEMENT ACTIVITIES/RESULTS

Fishery management activities include publicizing the stocked waters, in order to highlight the additional year-round angling opportunity provided by stocked fish and to provide alternatives to the harvest of wild stocks. Little Harding Lake was successfully converted to a special management lake providing opportunity to catch-and-release larger than average rainbow trout with a limited harvest opportunity, while more liberal opportunities for harvest were provided within a variety of settings from urban ponds to remote lakes.

BOF ACTIONS

The Department of Fish and Game is presenting a proposal to create a regional stocked waters management plan that will categorize waters and standardize regulations based on the angling potential of those waters and public input as to how the fishery should be structured. The proposal will be addressed at the January, 2004 BOF meeting.

ONGOING AND RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Research activities and management activities are addressed in the report in preparation by the Region III stocked waters staff.

Table 34.-Species, number stocked, and size of fish stocked into LTMA waters, 1999.

Size at Stocking	Species and Number Stocked ^a						Total
	Rainbow Trout	Coho Salmon	Chinook Salmon	Arctic Char	Arctic Grayling	Lake Trout	
Fingerling	52,906	28,000	0	6,050	0	0	86,956
Subcatchable	0	49,772	0	58,956	0	0	108,728
Catchable	98,398	0	29,742		1,300	4,904	134,344
Broodstock	1,055	0	0		0	0	1,055
Total	152,359	77,772	29,742	65,006	1,300	4,904	331,083

^a Depending on hatchery production and management needs, other mixes of sizes and numbers of each species are stocked in other years.

Table 35.-Species, number stocked, and size of fish stocked into LTMA waters, 2000.

Size at Stocking	Species and Number Stocked ^a						Total
	Rainbow Trout	Coho Salmon	Chinook Salmon	Arctic Char	Arctic Grayling	Lake Trout	
Fingerling	6,009	64,125	0	0	35,974	0	86,956
Subcatchable	0	0	0	0	0	0	0
Catchable	93,649	0	28,728	2,940	21,897	10,400	157,614
Broodstock	1,226	0	0	0	0	0	1,226
Total	100,884	64,125	28,728	2,940	65,005	10,400	264,768

^a Depending on hatchery production and management needs, other mixes of sizes and numbers of each species are stocked in other years.

Table 36.-Species, number stocked, and size of fish stocked into LTMA waters, 2001.

Size at Stocking	Species and Number Stocked ^a						Total
	Rainbow Trout	Coho Salmon	Chinook Salmon	Arctic Char	Arctic Grayling	Lake Trout	
Fingerling	62,750	42,000	0	0	0	0	104,750
Subcatchable	0	0	0	22,480	0	0	22,480
Catchable	76,551	0	31,460	0	18,678	4,495	131,184
Broodstock	1,360			0			1,360
Total	140,661	42,000	31,460	22,480	18,678	4,495	259,774

^a Depending on hatchery production and management needs, other mixes of sizes and numbers of each species are stocked in other years.

Table 37.-Species, number stocked, and size of fish stocked into LTMA waters, 2002.

Size at Stocking	Species and Number Stocked ^a						Total
	Rainbow Trout	Coho Salmon	Chinook Salmon	Arctic Char	Arctic Grayling	Lake Trout	
Fingerling	4,000	154,961	0	30,165	40,685	0	229,811
Subcatchable	0	0	0	0	0	0	0
Catchable	47,456	0	35,413	19,344	1,300	0	111,727
Broodstock	17			0			17
Total	51,473	154,961	35,413	60,029	1,300	0	341,555

^a Depending on hatchery production and management needs, other mixes of sizes and numbers of each species are stocked in other years.

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APPENDIX A

GENERAL FISHING SEASONS

The Tanana River drainage is open to sport fishing the entire year—**except for those seasons listed below or under Special Regulations.**

The open season for fishing in Little Harding Lake is **May 15 through September 30.**

Northern Pike Fishing Season:

The open season for northern pike fishing in **flowing waters** of the *Lower* Tanana River drainage is **January 1 through December 31—except:**

In the Tolovana River drainage, including Minto Flats and Goldstream Creek, including the Chatanika River, the open season for northern pike is **June 1 through Oct. 14.**

The open season for northern pike in **lakes** of the *Lower* Tanana River drainage is **June 1 through April 20-except:**

In Harding Lake, the open season for northern pike is **June 1 through March 31.**

Use of Spears or Bow and Arrow

Suckers and burbot may be taken with spear or bow and arrow the entire year.

Northern pike may be taken by spear or bow and arrow from **September 1 through April 30** and may be speared only by persons completely submerged from **Jan. 1 through Dec. 31, except in lakes and in the Tolovana River drainage (see above).**

Whitefish (excluding sheefish) may be taken by spear or bow and arrow from **Sept. 1 through April 30** and may be speared the entire year **only** by persons completely submerged.

BAG, POSSESSION, AND SIZE LIMITS

GENERAL REGULATIONS

The general regulations for all waters of the Tanana River drainage are listed below. **Special regulations** for individual water bodies are listed on pages 12-15.

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Daily Bag, Possession, and Size Limits

<i>Species</i>	<i>In Flowing Waters</i>	<i>In Lakes</i>
King salmon	1 no size limit	10 in combination
Chum salmon	{ 3 in combination }	no size limit
Coho salmon	{ no size limit }	
Arctic char/Dolly Varden	10 no size limit	10 no size limit
Lake trout	2 no size limit	2 no size limit
Rainbow trout	10 no size limit	10 no size limit
Arctic grayling	5 no size limit	5 no size limit
Whitefish	15 no size limit	15 no size limit
Sheefish	2 no size limit	2 no size limit
Northern pike	5 (only 1 over 30 inches) 5 (only 1 over 30 inches) (open season—June 1 through March 31)	
Burbot	15 no size limit	5 no size limit
Other fish	no bag, possession or size limits	

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Burbot Set Line Regulations

Statewide

The total aggregate number of hooks which may be used each day for set lines may not exceed the daily bag limit for burbot in the water being fished (e.g., if the daily bag limit is five burbot, then a total of five hooks may be fished each day). More than one hook may be attached to a set line.

All hooks must be single hooks with a gap between point and shank larger than $\frac{3}{4}$ inch.

Each hook must be set to rest on the bottom of the lake or stream.

Each set must be labeled with the angler's name and address.

Each set must be physically inspected at least once during each 24-hour period.

Tanana River drainage—lakes

Burbot set lines **may not** be used in Harding Lake.

In all other lakes in the *Lower* Tanana River drainage, burbot set lines may be used **only** from October 15 through May 15.

Daily bag and possession limit in lakes where set lines are allowed is 5 burbot, any size.

Tanana River drainage—rivers and streams

Set lines may be used year-round to catch burbot in all flowing waters of the Tanana River drainage.

Daily bag and possession limit in rivers is 15 burbot, any size.

Ice houses

All ice houses not removed from the ice at the end of a day's fishing must be registered and a permit obtained from the ADF&G. Each registered ice house must have the permit number displayed on its side and roof in distinguishable numbers not less than 12 inches in height. Ice houses must be removed from all water bodies by April 30.

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SPECIAL REGULATIONS

Unless listed below, seasons, bag and possession limits for the *Lower* Tanana River drainage appear in the general regulations.

CHATANIKA RIVER AND ITS TRIBUTARIES:

1. Arctic grayling:

April 1 through May 31, ***catch-and-release only***. All grayling **must be released** immediately.

June 1 through March 31, daily bag and possession limit is 5 fish. All **must be 12 inches or larger**.

2. April 1 through May 31, only unbaited, single-hook, artificial lures may be used upstream from the ADF&G marker located 1 mile upstream of the Elliott Hwy. bridge.

3. ***Closed to all salmon fishing*** upstream from the ADF&G marker located 1 mile upstream of the Elliott Highway bridge.

4. Whitefish:

Daily Bag and Possession limit is five fish. Least ciscos may not be retained.

Whitefish may not be taken with spear or bow and arrow.

Closed to all whitefish fishing:

- from September 1 through April 30, upstream from the ADF&G marker located 1 mile upstream of the Elliott Highway bridge.
- from October 1 through April 30, downstream from the ADF&G marker located 1 mile upstream of the Elliott Highway bridge.

5. Northern pike:

- season open June 1 through October 14 only.
- daily bag and possession limit is 5 fish; **only 1 may be over 30 inches long**.

6. Only a **single hook** may be used when fishing in that portion of the Chatanika River from the mouth of Goldstream Creek upstream to the boundary of the Fairbanks Nonsubsistence Use area (identified by an ADF&G marker located approximately 1 mile downstream of the Murphy Dome Road).

CHENA RIVER AND ITS TRIBUTARIES:

1. Arctic grayling:

- ***catch-and-release only*** for the entire year. All grayling **must be released** immediately.

2. Upstream of Chena River dam, only unbaited, single-hook, artificial lures may be used.

-continued-

Special Regulations-continued)

3. Downstream of Chena River dam, bait may be used on hooks with a gap larger than $\frac{3}{4}$ inch.
4. ***Closed to salmon fishing*** upstream from the ADF&G marker located 300 feet downstream of the Chena River dam.

DUNE LAKE

1. Rainbow trout: Daily bag and possession limit is five fish; only one may be over 18" long.

FIVE-MILE CLEARWATER CREEK:

1. Arctic grayling:
 - daily bag and possession limit is 2 fish, **only one** of which **may be over 12 inches**.
2. Only unbaited, **single-hook**, artificial lures may be used from January 1 through August 31.
3. Only unbaited, artificial lures may be used from September 1 through December 31.

HARDING LAKE:

1. Northern pike:
 - Closed year-round to northern pike fishing. This includes catch-and-release fishing..
2. Burbot:
 - daily bag and possession limit is 2 fish, no size limit.
3. Set lines may not be used.
4. Harding Lake is closed to the taking of northern pike with spear or bow and arrow.
5. Lake trout:
 - daily bag and possession limit is 1 fish; which **must be 26 inches or larger**.

KANTISHNA RIVER DRAINAGE (downstream from the mouth of the Toklat River:

1. Chum salmon:
 - August 15 through December 31, ***catch-and-release only***. All chum salmon **must be released** immediately.

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LITTLE HARDING LAKE:

1. Open to fishing from May 15 through September 30 only.
2. Only unbaited, single-hook, artificial lures may be used.
3. Rainbow trout:
 - daily bag and possession limit is 1 fish which **must be 18 inches or larger.**

PILED RIVER SLOUGH (upstream from its confluence with Moose Creek)

1. Arctic grayling:
 - ***catch-and-release only*** for the entire year. All grayling **must be released immediately.**
2. Only unbaited, **single hook**, artificial lures may be used.

SALCHA RIVER AND ITS TRIBUTARIES

1. Arctic grayling:
 - April 1 through May 31, ***catch-and-release only.*** All grayling **must be released** immediately.
 - June 1 through March 31, daily bag and possession limit is 5 fish. All **must be 12 inches or larger.**
2. Only unbaited, artificial lures may be used upstream of the Richardson Hwy. bridge, except that bait may be used only on hooks with a gap size larger than $\frac{3}{4}$ inch throughout the Salcha River drainage.
3. Fishing from the Richardson Highway bridge over the Salcha River is ***prohibited.***
4. ***Closed to salmon fishing*** upstream from the ADF&G marker located about 2½ miles upstream of the Richardson Hwy. bridge.

TOKLAT RIVER DRAINAGE: *Closed to sport fishing August 15 through May 15.*

TOLOVANA RIVER DRAINAGE—including Minto Flats, Tatalina River, and Goldstream Creek:

1. Northern pike:
 - season open June 1 through October 14 only.
 - daily bag and possession limit is 5 fish; **only 1 may be over 30 inches long.**

APPENDIX B

PROPOSAL 107, Page 110, - 5 AAC 70.XXX. Stocked Waters Management Plan for the Arctic-Yukon-Kuskokwim Area.

This proposal seeks to adopt a Regional Stocked Waters Management Plan that would provide a framework for setting regulations in all stocked waters in the Arctic-Yukon-Kuskokwim (AYK) and Upper Copper/Upper Susitna (UCUS) regulatory areas.

WHAT WOULD THE PROPOSAL DO? Place all regional stocked waters into one of three regulatory categories, based on a number of factors such as level of participation, ease of access, stocking density, and type of angling opportunity desired.

WHAT ARE THE CURRENT REGULATIONS? 5 AAC 70.022 (a-e) and 5 AAC 52.022. Bag and possession limits for stocked waters vary by location and species, depending on stocking levels and fishery participation. Daily limits range from 2 to 10 per day (per species) with several cumulative limits (all species combined) of 30 fish per day. Several systems have length limits and seasons are open year-round.

WHAT WOULD BE THE EFFECT IF THE PROPOSAL IS ADOPTED? Regulations for all stocked waters in the AYK and UCUS regulatory areas would be standardized and simplified under a three category system: High Yield (10 fish per day of all species combined, 1 over 18" in length, open year-round); Conservative Yield (5 fish per day all species combined, 1 over 18", open year-round); or Special Management (1 fish of any species or catch-and-release). These categories were designed to accommodate a diversity of fishing opportunities sought by the public.

BACKGROUND: Regulations for stocked waters have generally been very liberal, but have also been restricted in some instances to attempt to provide larger fish in specific waters. Because harvest from stocked waters can be large without biological concerns, regulations have been liberal. There have been a number of proposals in the past few years to manage some stocked waters for the harvest (or catch) of fewer, but larger, fish.

DEPARTMENT COMMENTS: The department submitted this proposal, and we continue to **SUPPORT** it.

COST ANALYSIS: Adoption of this proposal is not expected to result in additional direct costs for private individuals to participate in area stocked waters fisheries.

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PROPOSAL 109. Page 113, 5 AAC 70.XXX. Management Plan for Arctic Grayling in the Arctic-Yukon-Kuskokwim Area.

This proposal seeks to adopt a Regional Arctic Grayling Management Plan that would provide a framework for setting regulations for all Arctic grayling fisheries in the AYK and UC/US regulatory areas.

WHAT WOULD THE PROPOSAL DO? Place all Arctic grayling regulations in the region under one of three regulatory options, based on a number of factors such as stock size and structure, level of participation, level of estimated harvest and/or catch, ease of access, and type of angling opportunity desired. The three categories include a background regulation with a 5 fish bag limit and few length restrictions to special management areas with limited harvest opportunity.

WHAT ARE THE CURRENT REGULATIONS? Bag and possession limits for Arctic grayling vary by location, depending on the type of fishery. Regulations range from closed to fishing to 10 per day, but bag limits are generally between 2 to 5 per day, and in some cases include length restrictions. In some areas, seasons are open year-round, and some areas have spring spawning restrictions.

WHAT WOULD BE THE EFFECT IF THE PROPOSAL IS ADOPTED? Regulations for Arctic grayling in all waters in the AYK and UCUS regulatory areas would be standardized and simplified with the use of a category system based on the characteristics of the fishery. These regulatory options are designed to protect stocks while allowing for a diversity of opportunity.

BACKGROUND: Arctic grayling regulations in both the AYK and UC/US regulatory areas have, in general, become more restrictive over the past 20 years. These restrictions have been in response to increases in estimates of participation, harvest, and catch, and in some cases, declines in estimated abundance of specific stocks.

DEPARTMENT COMMENTS: This is a department submitted proposal, and we continue to **SUPPORT** it.

COST ANALYSIS: Adoption of this proposal is not expected to result in additional direct costs for private individuals to participate in the area Arctic grayling fisheries.

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PROPOSAL 117, PAGE 120, - 5 AAC 70.022. WATERS; Seasons; bag, possession and size limits.

Amend this regulation to include the following:

In all flowing waters of the Chena River above the Nordale Road Bridge, catch-and-release only for the entire year. Below the Nordale Road Bridge, anglers' daily bag and possession limit is one grayling between June 1 and July 15. No grayling may be retained anywhere on the Chena River between July 16 and May 31.

WHAT WOULD THE PROPOSAL DO? This proposal would allow harvest of Arctic grayling from the Chena River downstream from the Nordale Road Bridge during a 1½ month period during the summer.

WHAT ARE THE CURRENT REGULATIONS? - 5 AAC 70.022 (d)(11)(C) (ii).

Arctic grayling may be taken from January 1 through December 31 by catch-and-release fishing only.

WHAT WOULD BE THE EFFECT IF THE PROPOSAL IS ADOPTED? Opportunity to harvest grayling would be available in the lower 30 miles of the Chena River. The restriction on fishing with baited hooks with a gap smaller than ¾ inch would remain in place. The lack of a size limit would add inconsistency with regulations governing the harvest of grayling in other high-use Tanana drainage waters. Grayling fishing upstream from Nordale Road and in tributaries of the Chena River would remain restricted to catch-and-release.

BACKGROUND: The Chena River grayling stock provides a valuable, highly accessible, high-use fishery. The fishery has been restricted to catch-and-release since 1992 due to effort levels and perceived overharvest. This restriction was the final action in a series beginning in 1987 that were enacted in response to declining grayling abundance and size. The most recent abundance estimate of Arctic grayling in the Chena River was ~28,000 fish in 1998. Allowing a moderate harvest at this time (~800-1,000 fish) will likely result in changes to the population size structure. This change would be considered deleterious to the fishery by some anglers.

DEPARTMENT COMMENTS: The department is **NEUTRAL** on this proposal. The likely small amount of harvest afforded by this proposal would also result in more complicated regulations.

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COST ANALYSIS: Adoption of this proposal is not expected to result in additional direct costs for private individuals to participate in this grayling fishery.

PROPOSAL 119, 5 AAC 70.030(d). Methods, means and general provisions-finish. Amend this regulation as follows:

In the Tanana River drainage, any ice house not removed from the ice at the end of the day's fishing must have either current name and phone number, or Alaska ID in distinguishable characters or numbers not less than 12 inches in height.

WHAT WOULD THE PROPOSAL DO? It would do away with the current numbering and registration permit process and replace it with a requirement that an ice house owner display a name and phone number or personal ID number on the side of the fish house.

WHAT ARE THE CURRENT REGULATIONS? 5 AAC 70.030(d). In the Tanana River drainage, any ice house not removed from the ice at the end of the day's fishing must be registered and a permit secured annually from the department. A registered icehouse must have the permit numbers displayed on the side and on its roof in distinguishable numbers not less than 12 inches in height.

WHAT WOULD BE THE EFFECT IF THE PROPOSAL IS ADOPTED? This proposal would change the owner identification process for ice houses and eliminate the department's authority and responsibility to require registration and issue permits for ice houses in the Tanana drainage. No records pertaining to ice houses, including information regarding number in use, ownership, and water upon which they are in use would be available to ADF&G management and research staff unless staff personally visited each lake, including those in remote areas. In addition, elimination of the requirement that the I.D. be displayed on the roof would virtually eliminate the ability to safely document ownership of ice houses from an aircraft unless the aircraft landed near the ice house.

BACKGROUND: The current requirement for ice house registration in the Tanana drainage has existed since 1969. In 2003 this regulation was expanded to include the Upper Copper-Upper Susitna regulatory area. Permits are issued to those with fishing licenses or permanent (over 60) hunting and fishing I.D.s. While it must be renewed annually, the ice house number remains the same across years unless it is not renewed for two consecutive years. In the Tanana River drainage, permits and numbers are issued from the Fairbanks and Delta Junction ADF&G offices.

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DEPARTMENT COMMENTS: The department is **OPPOSED** to this proposal. The justification alludes to a difficulty with field identification of the owner of an ice house. This issue has likely been resolved with the development of a computerized registration system to which ADF&G and FWP personnel have unrestricted access. The issue of undocumented changing ownership would not be resolved by this proposal, since there is no requirement that the owner be present when the ice house is in use.

COST ANALYSIS: Adoption of this proposal is not expected to result in additional direct costs for private individuals to participate in area fisheries.

PROPOSAL 165: Page 164. 5 AAC 01.225. Waters closed to subsistence fishing; 5 AAC 05.350 Closed Waters; and 5 AAC 70.022 Waters; seasons; bag limits and size limits for the Yukon-Kuskokwim Area.

WHAT WOULD THE PROPOSAL DO? This proposal would close all spawning streams to any fishing including ½ mile downstream from the mouth and ¼ mile upstream. No fishing would be allowed until the department, by EO, opens fishing when they have reached the escapement goal and the department makes sure they monitor these spawning streams.

WHAT ARE THE CURRENT REGULATIONS? 5 AAC 01.225; 5 AAC 05.350; AND 5 AAC 70.022. Numerous waters have been closed to commercial, sport, and subsistence fishing, largely to protect small spawning stocks. Geographic areas have been closed when harvests from those areas pose threats to conservation of stocks.

WHAT WOULD BE THE EFFECT IF THE PROPOSAL WERE ADOPTED? The effect would be to substantially reduce fishing opportunity in subsistence, commercial and sport fisheries in the Yukon drainage.

BACKGROUND: Escapement goals have been established for very few Yukon River tributaries. Of these, the number of tributaries in which in-season escapement assessment projects are in place is still small. For example, only the Chena and Salcha rivers have ground-based, in-season assessment for Chinook salmon escapement goals. Most of the tributaries for which some type of escapement target has been set rely on post-season assessment. Hence, very few tributaries could ever be opened for fishing under the proposed regulation. This would primarily affect subsistence and sport fishing in tributary streams.

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DEPARTMENT COMMENTS: The department is **OPPOSED** to this proposal. It is not practical to close all fishing until escapement goals have been met. Nor does the department have the resources to develop and monitor escapement goals as requested by this proposal. This proposed regulation unnecessarily restricts fishing opportunity for all users without any biological or conservation reason cited.

COST ANALYSIS: Approval of this proposal is not expected to result in an additional direct cost for a private person to participate in this fishery.

SUBSISTENCE REGULATION REVIEW:

1. Is this stock in a non-subsistence area? No, except for salmon in the Fairbanks Non-subsistence Area (primarily Subdistrict 6-C).
2. Is the stock customarily and traditionally taken or used for subsistence? Yes, the Board has made a positive customary and traditional use determination for all salmon in the Yukon-Northern Area.
3. Can a portion of the stock be harvested consistent with sustained yield? Yes.
4. What amount is reasonably necessary for subsistence use? The Board has determined the following ranges by species are necessary to meet subsistence needs.

King Salmon	45,500-66,704
Summer Chum Salmon	83,500-142,192
Fall Chum Salmon	89,500-167,100
Coho Salmon	20,500-51,980

5. Do the regulations provide a reasonable opportunity for subsistence use? The board will need to make this finding.

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6. Is it necessary to reduce or eliminate other uses to provide a reasonable opportunity for subsistence use? In some recent years for some species, it has been necessary to reduce or eliminate other uses to provide a reasonable opportunity for subsistence use.

PROPOSAL 174, PAGE 171, 5 AAC 70.022(c) and 5 AAC 05.360(f). Yukon River King Salmon Management Plan. Amend this regulation as follows:

The sport fishery in the Yukon River drainage will be managed in accordance with the subsistence salmon net and fishwheel openings and closures.

WHAT WOULD THE PROPOSAL DO? This proposal, if adopted, would align the opening and closing of the sport fishery with the gill net and fish wheel subsistence fisheries.

WHAT ARE THE CURRENT REGULATIONS? 5AAC 70.022 (c-d). Sport fishing is permitted year round in waters of the Yukon River portion and the Tanana River portion of the Arctic-Yukon-Kuskokwim Area.

WHAT WOULD BE THE EFFECT IF THE PROPOSAL WERE ADOPTED? The effect would be to substantially reduce the opportunity for sport anglers to participate in area fisheries, by requiring that all sport fishing be closed whenever subsistence salmon fishing is closed.

BACKGROUND: During the meeting in January 2001, the Alaska BOF directed the department to establish a weekly schedule for the gillnet and fish wheel subsistence fisheries. The subsistence fishing schedule was adopted to 1) to spread the harvest throughout the run thereby reducing the impact on any particular component of the run during years of low run size, and 2) to distribute more fish to upriver districts in order to provide more equitable subsistence opportunities among subsistence users. The fishing schedule was based on past fishing patterns and was designed to provide reasonable opportunity for subsistence users to meet their needs during years of average to below average runs. The goal of the schedule is to provide windows of time during which salmon fishing is closed.

Consistent with conservative management of the fishery, the sport bag and possession limit for king salmon was reduced from three fish to one prior to the arrival of king salmon in the river during 2001-2003. The pre-season action to reduce the bag limit was taken because the department cannot reliably determine run strength until in-season assessment information is available. Actions taken to relax or increase restrictions in the sport fishery have consistently been in response to the level of abundance based on in-season indicators.

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Estimated annual sport harvests of king salmon in the entire Yukon drainage (excluding the Tanana drainage) have been around 100 fish. Estimated annual sport catches of king salmon from the same area have been under 500 fish. Management of the sport fishery for king salmon focuses on providing a reliable level of opportunity for anglers to participate in the fishery, not a high level of yield or harvest.

DEPARTMENT COMMENTS: The department is **OPPOSED** to this proposal. Historically, salmon and resident fish production in the Yukon River has been in excess of the needs for spawning escapement and subsistence use. The current bag and possession limits for salmon are considered very conservative for rural sport fisheries. It is the department's opinion that the current management plan is working and there is no need for further regulatory action regarding the sport fishery.

COST ANALYSIS: Adoption of this proposal is expected to result in additional direct cost for private individuals to participate in Yukon River king salmon sport fisheries.

APPENDIX C

Appendix C.—Reference information specific to 2004 Board of Fisheries proposals.

Proposal(s)	Topic	Page	Tables	Page
107	Stocked Waters Management Plan	8, 98	4a, 4b, 4c, 5, 6, 7, 8, 32, 33, 34, 35, 36, 37	20, 21, 22, 24, 26, 27, 28, 100, 102, 103, 104
109, 117	Arctic grayling sport fishery management	8, 23, 29, 31, 51 - 71	4a, 4b, 4c, 5, 6, 7, 8, 14,15,16, 17, 18, 19, 20, 21, 22	20, 21, 22, 24, 26, 27, 28, 52, 55, 59, 60, 63, 64, 68, 69, 72
165, 174	Sport Fishing Restrictions (If these proposals are read literally they seek to restrict all sport fishing within the LTMA and the entire report is germane. However, reference is provided to LTMA salmon fisheries.)	31 - 46	4a, 4b, 4c, 5, 6, 7, 8, 10, 11, 12, 13,	20, 21, 22, 24, 26, 27, 28, 34, 45, 47, 49